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The Internationalization of Environmental Regulation

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I. INTRODUCTION

Historians will look back on the latter part of the twentieth century as a watershed in the history of environmental regulation, not so much because the world addressed problems in a particularly judicious manner, but rather because the configuration of forces driving environmental regulation changed dramatically. Where nations and states once viewed regulation of pollution and natural resources as a local or national issue, economic, political, and institutional forces have now pushed them to see many environmental problems as global in scope.

This new perception has changed the nature of the international environmental "game," Nation states remain major players in determining environmental policy, but formal and informal linkages across nations have become increasingly important.[1] International bodies, such as the United Nations Economic Committee for Europe (ECE), the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO), are playing a larger role in environmental decisionmaking processes.[2] This "internationalization" of the field has led to many international agreements, including regulation of nitrogen oxides pollution and substances that deplete the ozone layer.

Although commentators have explored individual environmental agreements in some depth, few have constructed a framework to

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1. This is true more generally for economic patterns as well. Decreases in the cost of communication and transport have increased economic interdependence, giving rise to a highly interconnected global economy.

2. Jacobson & Kay; *A Framework for Analysis*, in ENVIRONMENTAL PROTECTION: THE INTERNATIONAL DIMENSION at 1, 10 (D. Kay & H. Jacobson eds. 1983).

explain the development of these agreements.[3] In this Article we shall attempt to create a framework capable of explaining the formation and shape of individual environmental agreements. We shall do so by shifting the emphasis from an individual or comparative case study approach to a generalized theory-building perspective. Specifically, we will derive theoretical tenets from a comprehensive review of multilateral environmental agreements on air pollution.[4] This analysis will demonstrate the strengths and limitations of international responses to global environmental issues. This study will also remedy current misunderstandings about the forces driving the form and scope of multilateral international agreements, particularly in the environmental arena.[5]

Three themes emerge from our framework. First, a small number of critical factors dictate the emergence, as well as the shape, of environmental agreements.[6] Second, decisionmaking about "internationalized" environmental agreements flows from the dynamic interaction among these factors. Finally, domestic politics plays a substantial, and perhaps dominant, role in forming and shaping international environmental agreements.

Section II of this Article provides a brief history of international environmental regulation, describing the recent increase in the number of international environmental agreements and reasons for this trend. Section III discusses relevant literature on environmental agreements. Section IV develops a general framework for understanding agreements, along with a series of testable hypotheses, concentrating on an explanation of the conditions under which environmental agreements emerge and take shape. Section V investigates the implications of our

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3. *See* A. SPRINGER, THE INTERNATIONAL LAW OF POLLUTION: PROTECTING THE GLOBAL ENVIRONMENT IN A WORLD OF SOVEREIGN STATES (1983). Springer creates a legal framework within which one can systematically study questions of international environmental law. He does this through detailed analysis of the legal definitions of "pollution" and "reponsibility." This approach differs fundamentally from our analysis, which concentrates on the social, political, and scientific forces that drive the international environmental policy debate. *See also* Kindt, *International Environmental Law and Policy: An Overview of Transboundary Pollution*, 23 SAN DIEGO L. REV. 583 (1986).

4. In subsequent work, we plan to take a more detailed look at the factors leading to a variety of multilateral agreements, including agreements involving water pollution and species preservation.

5. Geographic circumstances essentially limit substantive United States bilateral environmental treaties to those with Canada and Mexico, although there are some agreements on migratory species with Japan and the Soviet Union. In addition to these substantive treaties, the United States has signed a number of agreements of varying formality involving cooperation in research and data gathering, equipment provisions and training.

6. In this regard, our analysis parallels that of Gerlach and Rayner. *See* L. Gerlach & S. Rayner, Managing Global Climate Change: A View from the Social and Decision Sciences (1988) (working paper ORNL/6390 available from Oak Ridge National Laboratories). However, we are interested in developing a more general theory of the shape of international environmental agreements that is, in principle, testable.

theory for national policy. We part company with those who attribute value to such agreements in and of themselves, and suggest that some consideration of economic costs and benefits should enter into decisions whether to sign particular accords. This section also includes an example of how the theory will work in an area of current environmental concern.

II. THE HISTORY OF MULTINATIONAL ENVIRONMENTAL AGREEMENTS

A. The Internationalization of Environmental Issues

Nations and states did little to regulate pollution and to explicitly promote the conservation of natural resources before the latter part of the twentieth century.[7] Legal intervention usually centered around issues associated with resource exploitation, such as defining property rights. The limited response to environmental problems that characterized the early stages of industrial development has recently given way to a concerted effort to place a variety of direct regulations on pollution and other hazards.[8] The international law response to environmental problems has mirrored domestic developments. Nations initially responded to environmental threats by developing regulations independent of efforts elsewhere in the world. Although nations certainly shared information and research findings, environmental controls were voluntary and local in nature.[9] As a consequence, environmental protection was limited to local goals.

However, the growing perception of the global nature of many environmental problems has revealed the shortcomings of voluntary and national responses. This growing awareness has stimulated the discussion of environmental issues in a number of bilateral and multilateral policy arenas. Nation states are still the principal players in environmental policy, but the tools employed to achieve state policy now depend more on international relations.[10] In addition, international bodies and nongovernmental organizations now play a major role in shaping the debate on important environmental issues.[11] This "internationalization" has fostered a series of pathbreaking formal and

7. *See, e.g.*, Elliott, Ackerman & Millian, *Toward a Theory of Statutory Evolution; The Federalization of Environmental Law*, 1 J. OF LAW, ECON. & ORGANIZATION 317 (1985).

8. *See, e.g.*, COUNCIL OF ECONOMIC ADVISERS, ECONOMIC REPORT OF THE PRESIDENT ch. 5 (1989).

9. On sharing of research findings, see generally R. BRICKMAN, S. JASANOFF, & T. ILGEN, CONTROLLING CHEMICALS: THE POLITICS OF REGULATION IN EUROPE AND THE UNITED STATES (1985).

10. *See supra* note 1.

11. Jacobson & Kay, *supra* note 2, at 10.

informal international agreements, prominent among them the Montreal Protocol, which calls for the control of substances leading to stratospheric ozone depletion.

B. The Growing Use of Multinational Agreements

Conventional wisdom suggests that the number and scope of international environmental agreements have increased dramatically in recent years as a result of the internationalization of the global environment. Interestingly, little factual analysis exists in support of this view, perhaps because it seems so self-evident. A review of the multilateral environmental treaties signed by the United States lends some support for the conventional wisdom.[12]

Table 1 provides information on how the number and type of these treaties have varied by decade. The last lines of Tables 1A and 1B reveal that the number of multilateral environmental treaties signed and entering into force has in fact increased over the last sixty years.[13] Interestingly, this growth occurred unevenly across categories. Indeed, some categories of treaties were signed primarily during particular periods of time. For example, the three whaling treaties were signed from the 1930's to the 1950's, and the five air pollution treaties in the last decade. The table also suggests that the scope of treaties has broadened somewhat over time, with treaties now covering a wider array of environmental problems.[14]

C. The Forces Driving Internationalization

The increase in the number of environmental agreements can be explained at several levels. For example, Kay and Jacobson studied the evolution of particular institutions that addressed environmental problems, while Morrisette examined the development of scientific understanding. In contrast, this Article will focus on more general trends that affect the emergence of international environmental agreements. The forces contributing to this growing use of international agreements fall into four broad categories — scientific, psychological,

12. Treaties may not be a good surrogate for the total number of agreements. At the same time, we find the frequency distribution of treaties an interesting number in and of itself.

13. A complete list of the treaties covered in this table is provided in the Appendix to this Article. We use the word "environmental" broadly here to cover agreements involving air and marine pollution, species preservation, fisheries management, and regional conservation. We are not sure that this list covers the universe of treaties, but we believe it does represent most of the multilateral environmental treaties during this time period that the United States has signed.

14. It would be desirable to measure the impact of these treaties using some objective variables. This is, in principal, possible to do, but beyond the scope of the present study.

Table 1. U.S. Multilateral Environmental Treaties

Category	1930–39	1940–49	1950–59	1960–69	1970–79	1980–89
A. Treaties signed by U.S. per decade						
1. Fur and feathers		1			4	
2. Whaling	1	1	1			
3. Fishing			1	1		2
4. Marine pollution			1	1	3	1
5. Air pollution					1	4
6. Miscellaneous	–	–	1	1	1	–
Totals	1	2	4	3	9	7
B. Treaties entering force for U.S. per decade						
Category	1930–39	1940–49	1950–59	1960–69	1970–79	1980–89
1. Fur and feathers		1			3	1
2. Whaling	1	1	1			
3. Fishing				2		2
4. Marine pollution				1	2	3
5. Air pollution						4
6. Miscellaneous	–	–	–	2	–	1
Totals	1	2	1	5	5	11

economic and political.[15] Scientific understanding of environmental problems has grown dramatically over the last few years. The world has become more polluted and our knowledge of pollution and its effects has increased. Researchers now have better measuring devices and mathematical models of pollution that embody an improved understanding of physics and chemistry. We now recognize, for example, that the cumulative production and use of chlorofluorocarbons and halons has contributed to worldwide depletion of stratospheric ozone. In addition, our understanding of how pollution affects human health has improved.[16] This increase in scientific understanding has helped to define the scope of problems and to promote internationalized solutions.

Public awareness and concern over environmental risks has heightened significantly during the last few decades. Public perceptions of risk, often engendered by these scientific discoveries, also play a role in the increased number of environmental agreements. The environ-

15. We have not included law here because we are unaware of major changes in legal thought or processes that have spurred the increase in environmental agreements.

16. *See, e.g.*, L. LAVE & E. SESKIN, AIR POLLUTION AND HUMAN HEALTH (1977). This work examines the relationship between air pollution and mortality. For an examination of the impact of better scientific understanding on the development of environmental law, see Elliott, Ackerman & Millian, *supra* note 7, at 316.

mental movement has catalyzed this change by bringing issues it considers important to public attention. Rachel Carson's *Silent Spring* sensitized people to the possible dangers associated with increased use of pesticides.[17] Polls show that people view the motives of the business community with greater suspicion. The public no longer perceives that what's good for General Motors is necessarily good for the country.[18] The change in public attitudes toward environmental issues has contributed to the greater demand for some form of action.[19]

This new sensitivity to environmental concerns has also changed the nature of the political landscape. Environmental groups in the United States now play an important role in shaping both domestic regulations and international agreements.[20] In fact, the growing influence of national environmental groups has helped shape the response to environmental needs throughout the world.[21] Many countries now have environmental control agencies. Bureaucrats within these agencies receive benefits from developing action-oriented regulatory programs and identifying new problem areas.[22] Politicians have learned that a concern for environmental problems can translate into strong popular support. They have capitalized on the demand for environmental preservation by politicizing ominous ecological developments.

The media has contributed to the efforts of environmental groups and politicians. News stories focusing on sensational environmental events that particularly alarm the public, such as medical waste washing up on beaches, have aroused the public's fears. We do not mean to suggest here that the media does not play a valuable role in bringing to light important environmental concerns. However, it is important to recognize that the approach the media uses in reporting sensitive issues, such as Times Beach, Love Canal or the Antarctic "hole in the pole," can have a dramatic effect on the public's attitudes towards

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17. R. CARSON, SILENT SPRING (1962). For an alternative view of some of the issues raised in SILENT SPRING, see E. WHELAN, TOXIC TERROR (1985).

18. *See Is an Antibusiness Backlash Building?*, BUS. WEEK, July 20, 1987, at 71. *See also Backlash against Business*, ECONOMIST, April 15, 1989, at 11, 12.

19. *See, e.g.*, Lamm & Barron, *The Environmental Agenda for the Next President*, ENVIRONMENT, May 1988, at 6; Dunlap, *Polls, Pollution, and Politics Revisited, Public Opinion on the Environment in the Reagan Era*, ENVIRONMENT, July-Aug. 1987, at 7; Ladd, *Clearing the Air: Public Opinion and Public Policy on the Environment*, PUB. OPINION, Feb./Mar. 1982, at 16.

20. For an assessment of domestic impact, see for example, B. ACKERMAN & W. HASSLER, CLEAN COAL/DIRTY AIR (1981). For an overview of international influences, see Morrisette, *The Evolution of Policy Responses to Stratospheric Ozone Depletion*, 19 NAT. RESOURCES J. (1989) (forthcoming).

21. *See, e.g.*, Stanglin, *Seizing the Politics of Pollution*, U.S. NEWS AND WORLD REP., December 8, 1986; Mewes & Clark, *The Green Party Comes of Age*, ENVIRONMENT, June 1985.

22. R. Hahn, The Political Economy of Environmental Regulation: Towards a Unifying Framework, PUBLIC CHOICE (Working Paper 88-33, School of Urban and Public Affairs, Carnegie Mellon University) provides an overview of some of the bureaucratic and political forces that shape United States environmental policy.

environmental issues and the government's role in environmental regulation.

Several economic factors have also contributed to the number of recent agreements. Increased industrial activity has led to a general growth in economic welfare, as measured by standard income statistics.[23] As a consequence, the demand for a cleaner environment and related amenities has increased.[24] Another economic factor, the reduction in the cost of exchanging information, has also contributed to the increase in the number of agreements.[25]

III. THE STUDY OF MULTINATIONAL ENVIRONMENTAL AGREEMENTS

A. Previous Studies on International Environmental Agreements

Many scholars have analyzed the process by which nations reach international agreements. By and large, this research has used case studies to draw generalizations about the formation of international environmental agreements and to identify the factors leading to such agreements. For example, Wetstone and Rosencranz provide an account of the setting and negotiations that created the 1979 ECE Convention on Long-Range Transboundary Air Pollution.[26] Similarly, Morrisette describes the research and policy decisions leading up to the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.[27] Boxer recounts the role of the U.N. Environment Programme in the development of a series of agreements on pollution in the Mediterranean.[28]

While these studies provide valuable insights into the individual agreements, only Morrisette attempts to draw general conclusions regarding the internationalization of environmental regulation. He suggests that the process consists of two stages. In the first, governments take domestic action on the basis of a limited scientific consensus that a problem exists. As scientific consensus emerges and public concern grows, the second stage begins and the activities shift to international arenas.[29]

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23. DIRECTORATE OF INTELLIGENCE, CPAS 87-10001, HANDBOOK OF ECONOMIC STATISTICS 34 (1987).

24. *See generally* A. WILDAVSKY, SEARCHING FOR SAFETY (1988). It is a general precept of economics that wealthier consumers demand more amenities, such as safety.

25. *See* R. BRICKMAN, S. JASANOFF, & T. ILGEN, *supra* note 9.

26. Wetstone & Rosencranz, *Transboundary Air Pollution: The Search for an International Response*, 8 HARV. ENVTL L. REV. 1, 100–05 (1984).

27. Morrisette, *supra* note 20.

28. Boxer, *The Mediterranean Sea: Preparing and Implementing a Regional Action Plan*, in ENVIRONMENTAL PROTECTION: THE INTERNATIONAL DIMENSION, *supra* note 2, at 267.

29. *See* Morrisette, *supra* note 20.

Other scholars have approached the issue of environmental agreement formation more systematically. Jacobson and Kay have examined eleven case studies of international environmental efforts and assessed the factors that contribute to the sponsoring organization's effectiveness.[30] They suggest two broad categories, general background variables and organization-specific variables, and identify three background variables of particular relevance to the development of a more general theory. These are: (1) the characteristics of the problem (such as the existence of consensus on the nature of the problem and the level of costs associated with environmental measures); (2) the characteristics of the individuals and organizations involved (such as individual states' willingness to assume a disproportionate share of the costs); and (3) the attitudes toward the problem (such as public perception of the immediacy of the threat and the visibility of the environmental problem's impact).

Our approach will resemble the one taken by Jacobson and Kay. However, their analysis differs from ours in two fundamental ways. First, they deal primarily with evaluating the effectiveness of international organizations engaged in environmental activities, whereas we will focus on identifying specific factors that affect the shape and emergence of multilateral environmental agreements.[31] Second, Jacobson and Kay place little emphasis on the impact of domestic politics on international environmental activities. In contrast, we argue that domestic political factors are critical to understanding the emergence of international environmental agreements.

B. Contributing Ideas from Related Fields

Scholarly literature describing general international agreements and public policymaking also applies to the specialized field of international environmental agreements. The analysis set forth in this Article will build on ideas borrowed from positive political theory, which attempts to show how political institutions affect political choices.[32] Related to this area of inquiry, theories about group formation lend

30. Jacobson & Kay, *Conclusions and Policy* in ENVIRONMENTAL PROTECTION: THE INTERNATIONAL DIMENSION, *supra* note 2, at 323–27.

31. *See* Jacobson & Kay, *supra* note 2, at 18–19, defining organizational effectiveness as a nontrivial task. Their criteria for effectiveness include: the realization of procedural and substantive goals, the attitude of program participants and observers, the performance of the program compared to other similar programs, and the environmental impact of the program. This definition of effectiveness has the advantage of being quite general, but the distinct drawback, as the authors note, of being difficult to measure. Moreover, programs can be effective in some dimensions and not others.

32. *See, e.g.*, A. DOWNS, AN ECONOMIC THEORY OF DEMOCRACY, (1957); Noll, *The Political Foundations of Regulatory Policy*, 139 ZEITSCHRIFT FUR DIE GESAMTE STAATSWISSENSCHAFT 377 (1983); P. ORDESHOOK, GAME THEORY AND POLITICAL THEORY: AN INTRODUCTION (1986).

themselves to the study of international environmental agreements, particularly those theories that explain group effectiveness within the political process.[33] The collective action literature teaches the important lesson that the distribution of benefits and costs from particular agreements will be a crucial factor in determining how individual countries respond to proposals.

Positive political analysis does not by itself sufficiently explain either the timing or the nature of the environmental agreements that we examine here. Several other factors, among them the public perceptions discussed above, also matter. A significant literature has documented the observation that "objective" or scientific measurements of risk do not necessarily coincide with personal or public concern with that risk.[34]

IV. TOWARD A GENERAL THEORY

A. The Prisoner's Dilemma

The area of game theory provides one approach to creating models of the cooperative and competitive dynamics of agreements. One of the more compelling ways of thinking about cooperative agreements is the classic prisoner's dilemma.[35] In this situation, each party will benefit more if all parties cooperate than if none do. At the same time, each benefits even more from not cooperating, regardless of what others do. Consequently, the individually rational outcome is that none of the parties cooperate. For example, the European countries might each be better off if pollution were reduced. However, each country has an incentive to attempt to develop a competitive advantage in industrial production by enjoying the benefits of the other countries' environmental protection activities, while taking limited action at home.[36] The chance of one country benefiting from the improved environment while refusing to enforce standards remains high. International agreements with enforcement powers can serve as a way out of the prisoner's

33. *See, e.g.*, R. HARDIN, COLLECTIVE ACTION (1975); M. OLSON, JR., THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS (1971); Becker, *A Theory of Competition Among Pressure Groups for Political Influence*, 98 Q.J. ECON. 371 (1983); Campos, *Legislative Institutions, Lobbying and the Endogenous Choice of Regulatory Instruments: A Political Economy Approach to Instrument Choice*, 5 J. L. ECON. & ORG. (1989) (forthcoming).

34. *See generally* Kraus & Slovic, *Taxonomic Analysis of Perceived Risk: Modeling Individual and Group Perceptions Within Homogenous Hazard Domains*, 8 RISK ANALYSIS 435 (1988).

35. *See, e.g.*, D. LUCE & H. RAIFFA, GAMES AND DECISIONS (1957).

36. It is important to recognize that for some pollution problems with local impact, for example sulfur oxides, countries might find it in their interest to take individual or unilateral action. For other problems, such as greenhouse gases, few if any countries would take unilateral action because of the highly dispersed nature of the benefits. This suggests that the prisoner's dilemma paradigm is not an adequate description of all international environmental problems.

dilemma, since theoretically all nations would be burdened with the increased costs.[37]

The prisoner's dilemma, however, cannot fully explain the dynamic within which international environmental agreements arise. The model makes a variety of simplifying assumptions about the unified interests of actors and the rationality of their decision making, and ignores the political climate within which they operate. In reality, environmental agreements flow from the combined pressure of numerous domestic interest groups, each with different interests. Domestic political considerations have driven most regulatory efforts in the past and will probably continue to do so in the future.[38] Moreover, a variety of decision makers, each operating within dissimilar spheres of power, affect environmental policy. Importantly, the prisoner's dilemma does not account for these forces because the model assumes unitary rational actors focusing on singular interests. Consequently, the model cannot explain the effect these factors have on the formation of international environmental agreements.[39]

The incentives and pressures influencing the formation of international environmental agreements bear a strong resemblance to the factors influencing other areas of international cooperation. In particular, numerous parallels exist with strategic defense issues. Analysts have fruitfully applied game theory to decision-making in armed conflict and arms control agreements.[40] Here too, the limitations of standard game theoretic approaches, including the prisoner's dilemma, have been noted. For example, Berkowitz shows how domestic political

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37. The argument is similar to the case for setting uniform federal air quality standards as opposed to setting standards on a state-by-state basis. *See, e.g.*, Krier, *The Irrational National Air Quality Standards: Macro- and Micro-Mistakes*, 22 UCLA L. REV. 323 (1974). The limitations of this approach are examined in Kelman, *Competition Among the States: The Ethics of Regulatory Competition*, REGULATION, May-June 1982, at 39 and Olson, *Competition Among the States: A Response*, REGULATION, May-June 1982, at 44. Getting rid of uniform standards and allowing states to make these tradeoffs may actually increase welfare. *See* Oates & Schwab, *Economic Competition Among Jurisdictions: Efficiency Enhancing or Distortion Inducing?*, 35 J. PUB. ECON. 333, 334 (1988). The arguments for the desirability of more federal control depend crucially on political decisionmaking at various levels of government.

38. This is especially the case in industrialized nations and in the early stages of regulation. *See generally* J. DAVIES, THE POLITICS OF POLLUTION (1970). This early study of environmental regulation in the United States mentions international interests only in abstract terms.

39. For a cogent analysis of the prisoners' dilemma and its limitations in the context of arms reduction agreements see B. BERKOWITZ, CALCULATED RISKS: A CENTURY OF ARMS CONTROL, WHY IT HAS FAILED AND HOW IT CAN BE MADE TO WORK (1987). Berkowitz shows how domestic political forces render the standard prisoners' dilemma irrelevant for a large class of arms agreements. A similar argument can be made for environmental agreements. Moreover, many of the pollutants covered in international agreements are likely to have their most pronounced economic and environmental effects on domestic constituents.

40. *See generally* C. HITCH & R. MCKEAN, THE ECONOMICS OF DEFENSE IN THE NUCLEAR AGE (1960); T. SCHELLING, THE STRAGEGY OF CONFLICT (1960).

forces play an important role in shaping defense policy and strategic accords.[41]

B. Identifying Key Factors

In this section, as an alternative to the prisoner's dilemma, we outline a number of factors which form the beginning of a predictive theory about the emergence of environmental agreements. Though the analysis will focus primarily on treaty formation, the same factors can also be used to predict the likely shape of other international environmental agreements.

Table 2 summarizes observations from five agreements in the area of air pollution that can be used to develop a general theory.[42] The agreements and their provisions are:

(1) The Convention on Long-Range Transboundary Air Pollution ("LRTAP")[43] of 1979. This convention does not establish specific guidelines for air quality improvement, but signatories agree to research, monitor, and exchange information in order to develop policies for reducing air pollution.

(2) The Sulfur Emissions Protocol of 1985 ("Sulfur Protocol").[44] Signatories of this protocol to LRTAP agree to reduce sulfur emissions by thirty percent as part of an attempt to curb acid rain and to reduce air pollution.

(3) The Nitrogen Oxides Emissions Protocol of 1988 ("Nitrogen Oxides Protocol").[45] Starting in 1994 participating countries will limit nitrogen oxide levels to 1987 levels. Twelve West European countries agreed to roll back emissions by thirty percent over ten years.

(4) The Vienna Convention for the Protection of the Ozone Layer ("Vienna Ozone Convention").[46] The signatories agree to cooperate in research and to exchange information. The convention provides a

41. *See generally* B. BERKOWITZ, *supra* note 39.

42. Exploring the historical origins of these agreements may also provide insight, but we do not undertake to do so here in the interest of brevity and simplicity. For two insightful papers on the origins of recent air pollution agreements, the reader should consult Morrisette, *supra* note 20, and Wetstone & Rosencranz, *supra* note 26.

43. Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, T.I.A.S. No. 10541, *reprinted in* 18 I.L.M. 1442 (1979) [hereinafter LRTAP].

44. Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on the Reduction of Sulfur Emissions or Their Transboundary Fluxes by at Least 30 Per Cent, *done* July 9, 1985, *reprinted in* EXECUTIVE BODY OF THE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION, ECONOMIC COMMISSION FOR EUROPE, REPORT OF THE THIRD SESSION OF THE EXECUTIVE BODY, U.N. ECE Doc. ECE/EB.AIR/7, Annex I [hereinafter Sulfur Protocol].

45. Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution Concerning the Control of Emissions of Nitrogen Oxides or Their Transboundary Fluxes, *done* Nov. 1, 1988, *reprinted in* 28 I.L.M. 212 (1989) [hereinafter Nitrogen Oxides Protocol].

46. Vienna Convention for the Protection of the Ozone Layer, *opened for signature* March 22, 1985, *reprinted in* 26 I.L.M. 1516 (1987) [hereinafter Vienna Ozone Convention].

Table 2. Characteristics of Multilateral Air Pollution Aggrements[a]

	TREATIES				
Characteristics	LRTAP of 1979	SO_x Protocol of 1985	NO_x Protocol of 1988	Vienna Convention On Protection of the Ozone Layer, 1985	Montreal Protocol of 1987
1. Problem addressed	Reduction of transboundary air pollution	Reduction of SO_x[b]	Reduction of NO_x from mobile and stationary sources[c]	Protection of ozone layer from CFC's	Reduction of CFC use
2. No. of signatories[d]	34	21	25	41	46
3. Lag time from negotiation to need for action	4 years	8 years	2 years[e]	No significant action required	19 months
4. Type of action required	Monitoring, R&D, exchange of information	30% reduction in SO_x from 1980 level	Limitation of NO_x to 1987 (or earlier) levels	Research only	Restriction of CFC consumption
5. How monitored/ enforced	No enforcement	Self-monitored	Self-monitored with reports to executive body	No monitoring	Self-monitored with penalties to be determined at a later meeting
6. Scope of problem	Regional/global	Regional	Regional	Global	Global
7. Country-specific concerns addressed	Yes	No	Yes	No	Yes
8. Initiating body	UNECE	UNECE	UNECE	UNEP	UNEP

a The U.S. is a party to each of these agreements except the SO_x protocol. This list does not include the 1984 protocol to LRTAP for financing of the monitoring and evaluation of air pollutants in Europe.

b Sulfur oxides (SO_x) are considered a major contributor to acid rain.

c Nitrogen oxides (NO_x) contribute to both acid rain and ground level ozone.

d Number of signatories includes all countries that had signed the treaty, whether or not they had ratified, plus the number of countries that had deposited documents of accession, as reflected in U.S. State Department records as of February 15, 1989.

e It is unlikely that the U.S. will find the requirements of the Nitrogen Oxides Protocol binding until the mid- to late 1990's. Pending legislation on air pollution will likely become the binding constraint on nitrogen oxide emissions in the near term.

framework for negotiation of future protocols that would include regulatory measures.

(5) The Montreal Protocol on Substances that Deplete the Ozone Layer ("Montreal Protocol").[47] Signatories agree to freeze their use of chlorofluorocarbons at 1986 levels by the year 1989. They will then reduce use and production of chlorofluorocarbons to fifty percent of 1986 levels by 1999.

Based on the text of these agreements and the circumstances of their development, Table 3 provides a summary of how key variables affect the likelihood of reaching an agreement. Next to each variable in the column labeled "Effect" the table lists how an increase in that variable will affect the likelihood of reaching an agreement.[48]

Table 3. Variables Affecting the Likelihood of Signing International Environmental Agreements

Variable	Effect
Scientific Consensus	+
Public Perception of Risk	+
Costs of Control	−
Perception of Fairness	+
Short-term Political Benefits	+
Number of Participants	−
Previous Agreements	+
Monitoring/Enforcement	?
Forum of Negotiations	?
Scope of Impacts	?

Specifically, we argue that the likelihood of achieving an agreement increases with: (1) greater scientific consensus about the cause and seriousness of the problem; (2) increased public concern; (3) a perception on the part of the negotiating parties that other members are doing their "fair" share to address the problems; (4) an increase in short-term political benefits; and (5) the existence of previous, related

47. Montreal Protocol on Substances that Deplete the Ozone Layer, *opened for signature* Sept. 16, 1987, *reprinted in* 26 I.L.M. 1541 (1987) [hereinafter Montreal Protocol].

48. The likelihood or probability of reaching an agreement refers to the *ex ante* subjective probability that an agreement will be met. A "+" denotes an expected increase in the likelihood with an increase in the value of that variable; A "-" denotes an expected decrease; and a "?" denotes that the effect cannot be unambiguously predicted. Several other characteristics affect the formation of international environmental agreements in a less systematic manner. *See infra* notes 64–75 and accompanying text.

multilateral agreements. On the other hand, the likelihood of reaching an agreement should decrease as: (1) the costs of control increase; and (2) the number of parties to the agreement increases. The effect of the monitoring and enforcement scheme on the likelihood of agreement is more difficult to ascertain. After examining the factors with measurable effects on the likelihood of reaching agreement, we shall consider the effects of the other, less predictive considerations.

Scientific consensus: Scientific consensus on the severity of a problem is neither a necessary nor a sufficient condition for international agreement.[49] Nevertheless, agreements calling for significant changes in behavior will probably not emerge if scientists do not agree on the extent of the problem. For example, the 1985 Vienna Ozone Convention had little or no serious effect on the environment because the parties could not concur on a scientific model of the problem.[50] However, scientific evidence mounted from 1985 to 1987 regarding the damage to the ozone layer and the role of chlorofluorocarbons.[51] Increasing scientific certainty and public concern about adverse effects prompted the European delegations to shift their positions from one of encouraging only a freeze on the use of chlorofluorocarbons to one favoring a fifty percent reduction.[52] This growing scientific and political consensus contributed to the development of the Montreal Protocol.

Similarly, the evolving understanding of the damaging effects of sulfur oxides pollution and of the long-range spread of sulfates through the air induced countries to reconsider their negotiating positions. West German behavior in the period in which scientific consensus developed demonstrates this point. West Germany only reluctantly agreed to sign the essentially nonbinding LRTAP in 1979 after considerable pressure from France, Norway and Sweden.[53] Three years later West Germany provided active support for the 1982 Stockholm Conference, which drew strong conclusions regarding the need for action on transboundary air pollution abatement. The conference set the stage for the development of the Sulfur Protocol. This shift occurred in large part because of mounting scientific evidence that air pollution had seriously damaged West German forests.[54]

Public perception: A rise in public awareness and concern over the environmental problem in question also contributes to the conclusion of international environmental agreements. People generally consider new or unknown risks as more of a threat than old familiar concerns.[55]

49. *See supra* notes 43–45 and accompanying text.
50. *See* Morrisette, *supra* note 20.
51. *Id.* at 15–20.
52. *Id.* at 19.
53. Wetstone & Rosencranz, *supra* note 26, at 103.
54. *Id.* at 109.
55. *See* Kraus & Slovic, *supra* note 34, at 436.

Moreover, risks associated with catastrophic consequences attract greater attention and enhance public perception of risk, regardless of their likelihood. Taking all of these findings into account, studies conclude that the promulgation of regulations can depend more on these public perceptions than on scientific evidence of risk. For example, Morrisette notes how the so-called "hole in the pole," a break in the ozone layer over Antarctica detected in 1985, helped mobilize public and expert opinion.[56] The Montreal Protocol shows how this type of public pressure can force government officials to take action on issues they did not previously considered necessary or attractive.

Perceptions of fairness: Consideration accorded the special circumstances of different countries has also influenced the fate of individual agreements. For example, in 1985, the United States chose not to sign the agreement aimed at controlling sulfur oxide emissions, arguing that the agreement did not give it adequate credit for past actions taken to address the problem. In contrast, the United States ratified the subsequent Nitrogen Oxides Protocol, which provided it with special consideration for prior efforts to reduce nitrogen oxides emissions. Similarly, developing countries demanded concessions regarding chlorofluorocarbon use before they would sign the Montreal Protocol. The agreement allowed them to increase chlorofluorocarbon use up to 0.3 kilograms per capita annually. Other special provisions assured Soviet cooperation by allowing continued design and construction of new chlorofluorocarbon plants included in the Soviet Union's five-year plan.[57]

Perceptions of fairness become especially important when the agreement imposes large economic costs. A major part of the negotiations on the Montreal Protocol centered on devising a standard of fairness that would induce a large number of countries to participate. However, the standards advocated by parties often differ substantially, depending upon each party's particular interests and situation.[58] Developing countries tend to favor standards stated on a per capita basis because such rules provide more room for economic growth. Similarly, European and Scandinavian countries promote percentage reductions in emissions because such provisions deliver the largest net benefits to them. The United States generally frames issues either in terms of requiring all

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56. *See* Morrisette, *supra* note 20.

57. Even with these provisions, some potentially major users of CFCs chose not to sign/ratify the Protocol — most notably India, China and Brazil. *See* Department of State, Department of State Treaty Record — Montreal Protocol on Substances that Deplete the Ozone Layer (unpublished document available from the HARV. INT'L L.J.).

58. Fairness applies to the distribution of both benefits and costs. In addition to problems presented by the high costs of addressing the global warming issue, there will be significant difficulties arising from the fact that benefits are likely to be very unevenly distributed, and in ways that are hard to predict. *See supra* note 37 and accompanying text.

parties to use state-of-the-art control technologies or granting parties credit for prior efforts to reduce pollution. This position stems from the fact that in all air pollution control negotiations, the United States had already imposed more stringent emissions reduction measures than most other parties involved.[59] Lack of prior credit provisions, as in the case of the Sulfur Protocol, may keep the United States from signing a treaty.[60]

Political impact: The effect that an agreement will have on a government's domestic political position also influences the probability of reaching agreement in a systematic fashion. One of the primary motives for countries' acceptance of these agreements lies in the benefits that signature confers on political leaders. The appearance of action may even outweigh the importance of actual progress; the mere act of signing often garners more political credit for leaders than efforts to eradicate the problem. If an agreement will lead to economic costs, politicians generally prefer to impose those costs in the future. This desire, in addition to the more explicit goal of avoiding disruption, gives impetus to the typical provision of a grace period before an agreement goes into effect.[61]

Economic cost: Substantive environmental treaties designed to meet specific goals or create solutions must impose substantive restrictions or requirements on their signatories. These regulations, to the extent that they are effective, create economic costs that represent powerful disincentives against treaty formation. Accordingly, lower economic burdens make agreement more probable. Agreements that do not require significant changes in behavior will more likely gain the adherence of several countries.[62] This dynamic appears to have aided the development and acceptance of the Nitrogen Oxides Protocol. The agreement allowed most countries to postpone implementation of new regulations until the 1990's by providing credits for past ameliorative efforts.[63]

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59. U.S. Environmental Protection Agency, Briefing on International Comparison of Air Pollution Control, Aug. 5, 1988 (internal briefing document available from the Environmental Protection Agency).

60. Another reason is that the United States had a domestic program in place which it did not want to unduly disrupt. There was also a fear that the results of the United States research might be biased by participation in the Protocol.

61. *See* Table 2, *supra*, for data on time lags.

62. The Montreal Protocol, *supra* note 47, signed by 46 nations, represents an interesting case. While the number of participants is high, we think this resulted from widespread scientific consensus and public awareness of the problem, as well as the likely availability of substitutes over the time frame of the agreement.

63. *See* Nitrogen Oxides Protocol, *supra* note 45, at art. 2, para. 1. The protocol allows signatories to select any year as a basis against which to measure compliance, thereby accommodating reductions brought about by prior pollution control efforts.

Number of participants: The number of parties involved in an international environmental negotiation represents the last of the factors that systematically influence the likelihood of agreement. As more participants join the process, the difficulties associated with reaching agreement grow. Most importantly, each new party brings along a different agenda, interests and reservations that may conflict with other parties' plans. The window of potential agreement understandably narrows with the introduction of these additional issues. The transaction costs associated with reaching agreement also rise as the number of participants increases. The difficulties of coordinating increasingly complex negotiations accentuate existing administrative obstacles to agreement.

Previous agreements: Among the agreements we sampled, those calling for specific limitations of emissions all built on prior agreements. This fact may suggest that the probability of a substantive international agreement improves with prior consensus on the general nature of the issue. LRTAP, for example, represented an agreement to principles rather than to specific action. The Sulfur and Nitrogen Oxides protocols subsequently grew out of that convention. Similarly, while the 1985 Vienna Ozone Convention represented more of an agreement to agree than a commitment to action, it set the stage for the Montreal Protocol two years later.

C. Other Considerations

The preceding section dealt with factors that influence agreement formation and shape in a predictable or systematic manner. This section examines considerations that affect international environmental agreements in a less predictable manner.

Monitoring and enforcement: Noncompliance appears more attractive as the probability that signatories will have to pay the economic costs imposed by international environmental agreements increases. Strong monitoring and enforcement mechanisms could force all parties to bear their share of the costs. Because few countries desire to surrender such power, it is not surprising that international environmental agreements usually contain only weak enforcement mechanisms and that individual countries typically monitor their own compliance.[64]

This combination reinforces the incentives for treating international environmental agreements as tools of political rhetoric. Countries can reap the public image benefits of signature without bearing the cost of implementation. In short, signing weak agreements often makes

64. *See* Table 2, *supra*.

good political sense.[65] However, even weak agreements may have some environmental benefit by directing international attention on the issue, by laying the groundwork for future treaties, or by asserting moral pressure for voluntary compliance.

Of course some nations may desire substantive environmental agreements with actual bite, or strong enforcement of some issues with weak enforcement of others. A richer theory of agreements should take into account the interplay between parties' differing interests in assuring compliance and allowing noncompliance, and how that dynamic influences the development of the agreement.[66]

Forum: International environmental negotiations arise from or are conducted within a variety of international fora. Of the agreements we examine in Table 2, the first three—LRTAP, the Sulfur Protocol and the Nitrogen Oxides Protocol—came about under the aegis of the ECE.[67] The last two agreements—the Vienna Ozone Convention and the Montreal Protocol—were sponsored by the U.N. Environment Programme.[68]

Steering negotiations to a particular forum may have a great impact on the development of an international environmental agreement.[69] The negotiating and sponsoring forum is critical in two respects. First, international institutions often have special ties with specific groups of countries. Thus, LRTAP met under the aegis of the ECE because of that body's influence with the Eastern Bloc countries.[70] Similarly, the U.N. Environment Programme may provide the best forum for a global climate change agreement because of its influence with developing countries.[71] Second, the agency that sponsors an international environmental convention or negotiation generally becomes the sec-

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65. *See infra* note 77 and accompanying text for a description of the role of environmental issues in presidential politics.

66. For problems that are truly global in scope, such as stratospheric ozone depletion, signatories would want to make sure that other signatories could not free-ride at their expense. For example, the Montreal Protocol included sanctions about not trading with parties that did not sign the accord. Article 4, titled Control of Trade with Non-Parties, provides for the ban of trade in controlled substances with non-parties, as well as restrictions on substances containing, produced with, or used in producing ozone-depleting materials. On the other hand, for problems that are primarily intrastate or localized, countries will focus less on international mechanisms for monitoring and enforcement. Countries seem reluctant to give up autonomy on monitoring and enforcement at this juncture in history.

67. *See supra* notes 43–45.

68. *See supra* notes 46–47.

69. Jacobson and Kay observe that disagreements about which international organization should perform certain tasks reflect differences of opinion over organizational competencies and international goals, as well as conflicts arising from bureaucratic politics. Jacobson & Kay, *supra* note 2, at 12.

70. Wetstone & Rosencranz, *supra* note 26, at 101.

71. Interview with Konrad Von Moltke, Dartmouth University and World Wildlife Fund, in Washington, D.C. (Jan. 12, 1989).

retariat of that agreement, so the choice of a forum affects who will manage an agreement and how they will enforce it.[72]

Scope of environmental impact: The breadth of the issues addressed by negotiations may also affect international environmental agreements. One might think that the existence of a worldwide or regional problem involving all potential signatories to an agreement is a necessary condition for achieving a multilateral international agreement. Interestingly, experience shows that this is *not* the case. For example, the Nitrogen Oxides Protocol, recently signed by the United States, concerns a pollutant that apparently causes harm primarily at a regional level.[73] However, the treaties discussed in this Article do not represent a large enough sample to fully assess the systematic influence of this factor.

This theory of predictive factors does have inherent limitations. The framework outlined here is static, in that the theory considers only the likelihood of reaching an agreement at a specific point in time. Because agreements develop over time from initial discussion to implementation, a test of the theory must include variables that would indicate how the passage of time affects the probability of reaching agreements. Many of the factors listed in Section II as determining the growth in the number of environmental agreements over the past six decades would also apply to a description of the development of individual agreements.[74]

The strength of the preceding formulation based on the variables in Table 3 lies in its generality. Such a formulation might with minor

72. Many commentators have suggested an alternative form of administration for multilateral agreements modeled on the more authoritative Intergovernmental Joint Commission (IJC). This is thought to insulate the science and policy evaluation functions of the administration from politics. However, even if this rather questionable assumption were true, we believe it would be unwise to grant authority to an organization untied to domestic considerations such as politics, fairness, and budget. *Id.*; *see also* Wetstone & Rosencranz, *supra* note 26.

73. Based on existing scientific evidence, nitrogen oxide causes concern primarily because it is a precursor to ground level ozone. It also contributes to the formation of nitric acid and nitrates, which represents part of the acid rain problem. Because nitrogen oxide is not a transatlantic or global pollutant, there is little reason for the United States to be signing a limitation agreement with the Europeans, particularly if doing so carries significant costs. At the same time, however, the Canadians, who also signed the Nitrogen Oxide Protocol, may be a logical group (on scientific grounds) with whom the United States would negotiate an international agreement.

74. If a regression or limited-dependent variable approach were used, a parameter for time could be introduced into the equation. Alternatively, variables that were thought to affect the increase in the number of agreements could be measured directly. Wealth is one example of such a variable. *See supra* notes 23–24 and accompanying text. In addition, we have considered only finalized agreements; a complete test would require samples drawn from agreements that failed.

Finally, it is important to note that several of the factors discussed, such as forum and number of participants, are not outside the control of the negotiating countries. As such they may interfere with the identification of cause and effect that the regression equation is designed to measure.

modifications apply to almost any international or domestic agreement involving important scientific questions and risks and a number of interested parties.[75]

To be sure, other considerations may also affect the formation of environmental agreements. For example, non-governmental interest groups have on occasion assumed a vital role in shaping environmental issues.[76] In terms of general theory, however, the factors and considerations outlined above represent the dominant variables accompanying international environmental agreements and together provide considerable predictive power.

V. IMPLICATIONS FOR UNITED STATES POLICY

A. Domestic Pressures Leading to Environmental Agreements

This analysis suggests that the domestic constraints discussed above structure international environmental policy and shape the agreements that countries can achieve. This is not to suggest that there is no role for leaders who wish to strive for improvements in international environmental policy. However, the individual should understand the forces that shape the policy arena and use those forces to effect change.

As indicated in the preceding discussion, two of the factors that drive United States international environmental policy are domestic electoral politics and the ability to postpone economic costs. International environmental agreements often permit the President to claim credit for a seemingly major policy initiative while incurring little political risk. When the immediate economic cost remains low, the President loses little and stands to gain much by supporting such agreements. Indeed, Presidents have found it difficult to veto environmental programs, even when they have had a substantial price tag and offered little in the way of environmental risk reduction.[77]

The President also does not exercise sole authority over international environmental policy. If the Executive Office does choose to exercise

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75. Arms agreements are a case in point. *See* B. BERKOWITZ, *supra* note 39, for a cogent analysis of the incentives of individual countries and interest groups in fashioning such agreements.

76. *See* Caldwell, *Cooperation and Conflict : International Response to Environmental Issues*, ENVIRONMENT, Jan./Feb. 1985, at 6, 9. Caldwell notes a significant growth in the number of non-governmental environmental organizations, especially in the Third World countries. These organizations have taken advantage of economies of scale and scope through a world-wide networking process. Perry notes a similar trend among non-governmental organizations of scientists that arises from the need for international research collaboration. *See* Perry, *International Institutions: Managing the World Environment*, ENVIRONMENT, Jan./Feb. 1986, at 10, 13.

77. The Superfund program and legislation is an excellent example. *See, e.g.*, R. HAHN, A PRIMER ON ENVIRONMENTAL POLICY DESIGN (1989); Smith, *Superfund: A Hazardous Waste of Taxpayer Money*, HUM. EVENTS, Aug. 1986, at 2.

restraint and not to pursue an international agreement, Congress will attempt to fill the void. Indeed, even when the President tries to take the lead, members of Congress sometimes vie for the spotlight.[78] The case of global climate change presents a good example of this process. Congress passed the Global Climate Protection Act in 1987, which called for a series of studies to examine the effects of major changes in climate and to identify a range of policy options.[79] President Bush has recently stated his intention to expand "the leadership role of the United States in protecting our global environment."[80] These actions indicate the beginning of a battle between the legislative and executive branches to claim credit for any environmental breakthroughs.[81]

It is not only politicians and non-governmental organizations that promote international agreements. Bureaucrats in the State Department, Environmental Protection Agency and elsewhere directly benefit from promoting such agreements.[82] Pressure by parties harmed by environmental agreements, usually the affected industries, may influence the President and Congress.

The shape of the agreement also determines the economic impact on individual parties. Agreements are drafted in such a way as to apportion costs in response to basic political pressures. For instance, chlorofluorocarbon producers may actually benefit from the higher prices associated with restricted production mandated by the Montreal Protocol.[83] As is typical in such cases, consumers will bear the brunt of the economic costs in terms of higher prices.[84]

78. Elliott, Ackerman & Millian, *supra* note 7, argue that the competition among politicians in different branches of government can create a situation where legislation is adopted that is more stringent than any of the protagonists would have liked. The particular example the authors use was the passage of the Clean Air Act Amendments in the 1970's.

79. Global Climate Protection Act of 1987, Pub. L. 100-204, 101 Stat. 1407–09 (1987), *reprinted in* National Climate Program, 15 U.S.C.A. § 2901, notes (West 1987).

80. G. BUSH, BUILDING A BETTER AMERICA 84 (1989).

81. *E.g.*, *Scientist Says Budget Office Altered His Testimony*, N.Y. Times, May 8, 1989, at A1, col. 2. Sen. Albert Gore recently criticized the Office of Management and Budget for what he termed censorship of testimony in Senate Hearings. *See also*, *Bush Urged to Shift Stance on Global-Warmth Conference*, Wash. Post, May 10, 1989, at A2, col. 4. Sen. John Chaffee sent a highly publicized letter to President Bush stating that "[i]t is not to late to act" on global climate change.

82. The number of bureaucrats and political appointees running back and forth across the ocean to negotiate environmental agreements is not inconsequential. There are many private benefits from this travel and the personal networks that are formed as a result.

83. This will depend on how the property rights to produce and consume CFCs and halons are allocated. *See* Hahn & McGartland, The Political Economy of Instrument Choice: An Examination of the U.S. Role in Implementing the Montreal Protocol, NORTHWESTERN U. L. REV. (forthcoming) (Working Paper 88-34, School of Urban and Public Affairs, Carnegie Mellon University) for an analysis of this and related issues.

84. This analysis focuses solely on the distribution of economic costs. Presumably, the benefits from reduced rates of ozone depletion will be shared quite broadly. For an analysis of the costs and benefits associated with various levels of control, see generally OFFICE OF AIR AND REGULATION, U.S. ENVIRONMENTAL PROTECTION AGENCY, REGULATORY IMPACT ANALYSIS: PROTECTION OF STRATOSPHERIC OZONE (1987).

The President and the Congress will be under increasing pressure to reach environmental agreements that appear to address significant pollution problems.[85] Opponents of these agreements risk being identified as insensitive to environmental problems. For President Bush, who has promised to make the environment one of his top priorities, the pressures will be immense.[86] At the same time, the President has relatively few tools at his disposal to check the institutional forces promoting international environmental agreements. In the latter part of the Reagan Administration, officials at the Executive Office of the President made an attempt to require high level clearance within the White House before allowing participation in talks or establishing negotiating strategies for these agreements. This process would allow the President and interested agencies to study the possible domestic effects of an agreement before commencing negotiations solely for supposed foreign policy gains. To date, this proposal has met with only limited success.[87]

B. The Need for Presidential Leadership

The United States can only make rational decisions if policy makers examine the costs and benefits of participating in international environmental agreements. Because a number of the factors contributing to their formation and shape are substantially unrelated to the economic benefits of such agreements, the general theory predicts that many proposed agreements could have *negative* net economic effects. Public perception that a certain environmental problem poses a high level of risk, a factor vital in fostering an environmental agreement, does not in and of itself justify governmental action.[88] For many of the pollutants under consideration, the reduction in risk made possible by regulation does not offset the increased costs of control. If the government ignores this cost-benefit analysis, it may decide to sign

85. President Bush will have to make an early decision whether he wants to support an agreement related to the international transport of hazardous waste.

There may also be a proposal for an agreement on volatile organic compounds that follows in the footsteps of the sulfur and nitrogen oxide protocols. It is difficult to say how the United States will react toward this proposal until negotiators further develop the language for the agreement.

86. President Bush also may feel a need to change the view that Republicans have no interest in addressing environmental concerns. This will make it even more difficult not to sign agreements that enjoy the widespread support of other nations, particularly European nations or Canada.

87. Having played a part in this process, we conjecture that this limited success is due to the limited resources that the Executive Office of the President can use to control agency activities.

88. *See* ECONOMIC REPORT OF THE PRESIDENT, *supra* note 8, at 191–92.

environmental agreements that have significant adverse economic consequences.

A narrow economic calculation of costs and benefits, however, may neglect some important international political considerations. The State Department often argues that participating in and signing international environmental agreements enhances both the "leadership" role and the "credibility" of the United States.[89] In one sense, the State Department viewpoint is certainly correct. By participating in agreements, the United States negotiators can build up goodwill with other countries and this goodwill *may* increase their ability to obtain desired concessions in future agreements.[90]

Yet, these arguments about leadership and credibility are vulnerable to economic and political scrutiny. When the State Department pursues environmental agreements solely for goodwill or leadership purposes, it tends to neglect domestic economic costs that may outweigh foreign policy benefits.

In our view, the United States has little reason to base its policy on world environmental opinion. Instead, the President and other domestic politicians can shape domestic and world opinion by defining priorities.[91] President Bush should set priorities so as to ensure that the United States signs only effective and meaningful agreements. The President will be much less susceptible to criticism regarding the environment if he defines clearly articulated priorities that address the major environmental concerns of the American people and establishes policies accordingly.[92]

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89. *See* Wetstone & Rosencranz, *supra* note 26, at 112. The United States refusal to sign a joint, nonbinding decision paper on sulfur dioxide abatement in 1983 was a "blow to the international credibility of President Reagan's . . . environmental awareness[.]" *Id. See also* Interview with Richard Mott, Environmental Law Institute, in Washington D.C. (Jan. 12, 1989). Mott argues that by exercising leadership in the international environmental arena, the United States may be able to sway or coerce other countries whose domestic mandate alone has not been sufficient to cause action. *See also* Shepard, *The Politics of Climate*, EPRI J., June 1988, at 15, quoting Rafe Pomerance. "The Montreal accords [on CFCs] would never have been reached without consistent American pressure on the world community over a 10-year period . . . . [W]e should show the same kind of foresight and perseverance in convincing the world to control greenhouse gas emissions." *Id.*

90. However, it is important not to lose sight of the fact that other countries will want the United States to participate in most agreements that are truly global in scope, since the United States is likely to be a significant part of the problem as well as the solution.

91. *See* H. SMITH, THE POWER GAME: HOW WASHINGTON WORKS (1988), on the potential and limitations of using the office of the Presidency as a bully pulpit.

92. This statement is true in both the domestic and international arena. Indeed, we would argue that the President stands to lose credibility if he does not articulate such priorities, at least implicitly. This articulation does not require stating that specific problems are unimportant, but rather that a small number of problems will receive immediate attention.

C. The General Theory Applied: Global Climate Change

Finally, we examine the implications of the general theory for a topical environmental issue. The prospect of global warming resulting from the greenhouse effect will remain an important issue for the next few years.[93] What does the preceding analysis suggest about the likely response to global climate change? Based on current scientific understanding, which is admittedly incomplete, serious efforts at slowing the release of greenhouse gases would require major changes in lifestyle and exorbitant expenditures.

In addition, pollution control activities spread their benefits unevenly. Reducing global warming would benefit some countries much more than others.[94] For example, while the rise in ocean levels that might follow global warming would seriously damage Bangladesh and New Zealand, land-locked Bolivia and Switzerland would probably suffer little harm. These difficulties will not block change forever, but we doubt that any major policy shifts will occur in the near future.[95] A coordinated strategy aimed at prevention would require both a much greater consensus on the scientific aspects of the problem and a much greater level of public concern than currently exist.[96]

Nations will, however, feel continuing pressure to appear active in addressing this issue. They will probably respond with a series of

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93. *See* McDonald, *Scientific Basis for the Greenhouse Effect*, 7 J. POL'Y ANALYSIS & MGMT. 425 (1988), "Carbon dioxide and a wide variety of other gases, including methane, ozone, and freon, trap a portion of the earth's thermal radiation that would otherwise escape into space. This radiative trapping of energy produces the heating of the atmosphere popularly labeled the greenhouse effect." *Id. See also* WORLD METEOROLOGICAL ORGANIZATION, WMO/TD-No. 225, DEVELOPING POLICIES FOR RESPONDING TO CLIMATIC CHANGE (April 1988); Mintzer, *Living in a Warmer World: Challenges for Policy Analysis and Management*, 7 J. POL'Y ANALYSIS & MGMT. 445 (1988); and U.S. ENVIRONMENTAL PROTECTION AGENCY, THE POTENTIAL EFFECTS OF GLOBAL CLIMATE CHANGE ON THE UNITED STATES (1988).

94. *See* Waterstone, *The Equity Aspects of Carbon Dioxide-Induced Climate Change*, 16 GEOFORUM 301, 302 (1985). The Soviet Union might actually enjoy a longer growing season if global temperatures continue to rise.

95. *See* Lave, *The Greenhouse Effect: What Government Actions Are Needed?*, 7 J. POL'Y ANALYSIS & MGMT. 460 (1988). We are not alone in these conclusions. Lave notes that because policy must be developed in the face of great uncertainty, programs should be sought that "are unlikely to be harmful or costly if the greenhouse consequences are more benign than predicted and likely to help if the worst happens." *Id. See* Schelling, *Anticipating Climate Change: Implications for Welfare and Policy*, ENVIRONMENT, Oct. 1984, at 34. The author suggests that it is unlikely that there will be substantial reductions in greenhouse gas-generating fossil fuels in the near term, since governments have already failed to reduce consumption of these fuels in the face of ample reasons to reduce energy dependency. *Id.*

96. There are two general categories of policy responses to the climate change problem. Preventive measures are aimed at minimizing the actual changes in climate, and require a thorough understanding of the physico-chemical processes. These actions by necessity must be taken with a global perspective in mind. Adaptation simply refers to how human settlements respond to incremental changes in local climate.

We think it likely that some countries will take unilateral preventive action. Such action could have a small impact on the problem, but is likely to have more symbolic than real value.

formal and informal meetings aimed at shaping and disseminating research findings, and giving the appearance of making progress. However, only when a much higher level of scientific consensus emerges will nations seriously consider making difficult economic sacrifices.

VI. CONCLUSIONS

International environmental agreements will probably become a more popular vehicle for addressing global environmental concerns. This Article has provided a framework for understanding the emergence of such agreements. The analysis suggests that domestic politics is a key factor in shaping these agreements, but that several other factors, such as the distribution of economic costs and benefits, public perceptions, and scientific consensus also play an important role. The various pressures to sign international environmental agreements will continue and the political benefits of concluding such agreements, at least for the foreseeable future, will remain important. However, many of the agreements will not have a dramatic effect on individual behavior. Those that do will acquire their authority from a large degree of scientific consensus, as well as a public perception of the great importance of the problem.

We also offer a somewhat different perspective on the appropriate role for the United States in shaping environmental agreements. The kernel of our argument is that more agreements are not necessarily good for the President or the public.[97] In short, environmental priorities need to be set if we are to develop policies that foster economic growth while enhancing environmental quality.

APPENDIX

Mulitilateral Treaties Signed by the United States

Treaty description	Signed	In Force	(for U.S.)
Regulation of whaling	1931	1935	
Nature/wildlife conservation for the Western Hemisphere	1940	1942	
Regulation of whaling (with schedule of regulations)	1946	1948	
Prevention of marine pollution by oil (superceded by 1978 protocol)	1954	1958	(1961)
Protocol to whaling regulations	1956	1959	

97. Selected departments and agencies of the bureaucracy, such as the State Department or the Environmental Protection Agency, may benefit from the proliferation of agreements.

APPENDIX

Mulitilateral Treaties Signed by the United States

Treaty description	Signed	In Force	(for U.S.)
Fishing and conservation of living resources of high seas	1958	1966	
Antarctica treaty	1959	1961	
Conservation of Atlantic tunas	1966	1969	
Exploration and use of space	1967	1967	
Intervention on high seas in case of oil pollution casualties	1969	1975	
Wetlands/waterfowl protection	1971	1975	(1986)
Prevention of marine pollution from dumping wastes and other matter	1972	1975	
Conservation of Antarctic seals	1972	1978	
Trade in endangered species	1973	1976	(6 mos. later)
Intervention on high seas for pollution sources other than oil	1973	1983	
Military use of environmental modification	1977	1978	(1980)
Pollution from ships	1978	1983	(supercedes 1954 protocol)
Long-range transboundary air pollution (LRTAP)	1979	1983	
Antarctic marine life	1980	1982	
Conservation of North Atlantic salmon	1982	1983	
Oil pollution in the Caribbean	1983	1986	
Protocol to LRTAP for financing of the monitoring/evaluation of air pollutants in Europe	1984	1988	
Vienna convention for protection of the ozone layer	1985	1988	
Montreal protocol on substances that deplete the ozone layer	1987	1989	
NO_x protocol to convention on LRTAP	1988	Not decided	