The Press and Global Environmental Change: An International Comparison of Elite Newspaper Reporting on the Acid Rain Issue from 1972 to 1992

Edited By

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THE PRESS AND GLOBAL ENVIRONMENTAL CHANGE: AN INTERNATIONAL COMPARISON OF ELITE NEWSPAPER REPORTING ON THE ACID RAIN ISSUE FROM 1972 TO 1992

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CENTER FOR SCIENCE AND INTERNATIONAL AFFAIRS
AND
JOAN SHORENSTEIN BARONE CENTER ON THE PRESS, POLITICS AND PUBLIC POLICY

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Despite this assistance, some errors may remain. The responsibility for these is solely ours.

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THE PRESS AND GLOBAL ENVIRONMENTAL CHANGE: AN INTERNATIONAL COMPARISON OF ELITE NEWSPAPER REPORTING ON THE ACID RAIN ISSUE FROM 1972 TO 1992

Foreword

Almost everyone has an opinion on how the press covers public policy issues. Some people believe that reporters and their editors have a preconceived agenda and focus on those facts and stories that support that agenda, while others believe the press is more benign and has a limited effect in shaping public perceptions. Still others embrace the notion that press coverage reflects the biases and viewpoints of the government or the "establishment."

Environmental issues seem to trigger this debate over the accuracy and fairness of the media. Does the press deliberately exaggerate environmental threats? Are they beholden to one political interest or another? Where do reporters get their information? Why do they decide to pay attention to one aspect of a "story" rather than pursue a different tact? Finally, what factors tend to change a reporter's slant on an environmental issue?

Surprisingly, there has been a paucity of analysis about how the press covers environmental issues. Anecdotal descriptions are the rule, not the exception. Prompted by the vacuum in the scholarly literature and fueled by a generous grant from the IBM Environmental Research Program, scholars at Harvard's John F. Kennedy School decided to explore how the press in six different countries covered the issue of acid rain over a twenty-year period, 1972-1992. Under the direction of Prof. William Clark, teams of researchers were formed in six countries to analyze how one or two elite newspapers in each country selected for attention a subset of events, ideas, and perspectives related to the problem of acid rain and how it diffused these perspectives through society at large. The information obtained from each country was then compared to identify the similarities and differences between the countries.

This paper describes the results of this project. Professor Clark and Nancy Dickson plan to publish a book expanding on these themes which should be available in early 1997.

We at the Kennedy School deeply appreciate the confidence and support provided to us by IBM and particularly by Art Hedge (now retired), and Joe Sarsanski without whom this project would not have been possible.

Henry Lee

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ACID RAIN IN THE MEDIA: AN INTERNATIONAL COMPARISON

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1 INTRODUCTION

In an increasingly democratic world, the press would seem destined for ever more pivotal roles in the policy process. Yet in a world that is also increasingly interdependent, with each nation's affairs increasingly affecting and affected by others, it is far from clear just what those roles might be. Does the press, by reporting "the way it is" in places far from home exert an international homogenizing influence? Or does its habit of searching for a local "angle" on even the most global issues push policy debates towards an emphasis on special interests rather than common cause? How does press coverage of an issue in one country affect, and how is it affected by, press coverage in others? Do the roles played by the press in the policy process vary significantly across countries? Or is such variation swamped by country variation associated with different media, audiences, and editorial policies within countries? For those officials and experts used as news sources by the press, to what extent do the assumptions regarding the press developed through experience in their home countries provide reliable guidance for dealing with the press in other countries?

These and related questions arise with respect to press coverage of most policy issues. Our focus here is on the roles of the press in development of environmental issues. In particular, we are interested in how the press has dealt with the emergence of multinational, transboundary, or more generally "global" environmental issues over the last several decades. What has been the role of the press, nationally and internationally, in setting such issues on the policy agenda? What is and what should be the role of the press in shaping social responses to global environmental problems? What criteria should be used to evaluate the contribution of the press to the development of sound public policy on global environmental risks? How can the communication of science-laden ideas through the press be improved?

The study reported here is a preliminary effort to explore such questions.[2] It is conducted from the practical perspective of environmental scholars and policy analysts anxious to understand the roles of the press in the sorts of issues we deal with, to identify what seems to be working well and what badly in interactions among the press and the major newsworthy "players" in such issues, and to suggest some modest and pragmatic efforts that might be undertaken to facilitate improvements in those interactions. We are well aware that most of us involved in this effort are not professional scholars of press and politics. In our defense, we can only say that if such professional scholars had addressed the sorts of long-term, cross-national questions that we believe are central to understanding the role of the press in contemporary environmental affairs, we would have happily contented ourselves with reading their research and using it to inform our own. Our hope is simply that this preliminary investigation will raise questions and suggest patterns that others, more adequately equipped to the task, will find worth pursuing.

2 RESEARCH APPROACH AND METHODS

This section outlines the theoretical framework that informed our study, the rationale behind our selection of a specific case study focus, and the methods employed in our analysis.

2.1 Theoretical Framework

This study draws two distinct but related theoretical traditions. Scholarly work on the press and public policy establishes the context for our empirical investigation. Work on environmental risk communication clarifies the role of the press as a channel and filter for environmental risk information. Finally, we have conducted the work reported here in the context of a larger,

multinational, comparative study on Social Learning in the Management of Global Environmental Risks. That work establishes a typology of risk management functions and actors for this particular set of environmental risks. This typology allows an issue-specific analysis of public policy and risk communication topics. In addition, it facilitates comparison across press organizations and countries, and promotes understanding the ways in which the press and other social actors interact to identify, assess and respond to global environmental risks (e.g., Ernst 1988). The implications of the present work on the media for these larger social learning themes are explored elsewhere (Social Learning Group, forthcoming).

2.1.1 Press and Public Policy

Scholars have debated several competing hypotheses on the role of the press in shaping public policy. At one pole, the press has been characterized as an independent actor with significant "agenda-setting" power (e.g., McCombs and Shaw 1972; Patterson 1980), selecting certain social issues as important problems requiring action and marginalizing others. While proponents of this view recognize that the press is responsive to the interests of its audience, they argue that the press shapes as well as mirrors those interests (e.g., Weaver et al. 1981).

At a second pole, the press has been characterized as an instrument of national political elites, supporting the elites' social agendas, problem definitions and preferred solutions of these elites (e.g., Mills 1956; Herman 1986). A third perspective argues that the press has relatively limited effects in shaping public or elite perceptions of social problems (e.g., McLeod and Becker 1981).

Occupying the middle ground of this triangle are those who argue that the role and influence of the press vary with the particular characteristics of press organizations, the issue covered, the audience and the availability of other sources of information and evaluation. Studies of the construction of news by media organizations in the US and other countries (e.g., Schlesinger 1978; Gans 1979; Downing 1986; Blumner et al. 1987; Kocher 1987) argue that organizational and institutional variables such as traditions of objectivity or advocacy in journalism, dependence of press organizations on official sources for "newsworthy information" and the ability of powerful actors to impose financial and reputation costs on press organizations, structure and differentiate the role and influence of press organizations and national institutions.

Studies of the impact of media organizations on public opinion (e.g., Ebring et al. 1980; Graber 1980; Dunwoody and Neuwirth 1991) suggest that audiences are active, opinionated and selective consumers of information on public policy issues, not passive receivers easily manipulated by the press or other actor groups. Studies of the impact of the press on public policy decision making (e.g., Seymour-Ure 1974; Graber 1980; McLeod and Reeves 1982; Linsky 1985) emphasize the methodological problems researchers encounter when trying to specify cause-effect relationships between quantity, content or quality of media coverage and policy outcomes. Some (e.g., McLeod and Reeves 1982) argue for a broader operational definition of media impact, while others (e.g., Seymour-Ure 1974; Linsky 1985; Krimsky and Plough 1988) have used the detailed case study approach to illustrate the variety of ways in which the media can affect policy-making.

Incorporating previous theoretical and empirical work in press and public policy, this study postulated for each country studied that:

- the press does have a significant role in defining and prioritizing global environmental risks for social response;

- its performance of this role is influenced both by powerful, interested parties (defined as "actor groups" for purposes of this study) and by internal organizational incentives (see the discussion of the press and environmental risk communication below);

- empirical investigation is necessary to clarify how interaction between the press and other actor groups affects press coverage;

- empirical investigation is also necessary to clarify how press coverage affects public policy development;

- evaluation of the contribution of press coverage to policy development must consider both the significant differences in resources among press organizations and countries and the dynamic interaction among actors.

2.1.2 Environmental Risk Communication

Theorists of environmental risk communication have concentrated on the persistent discrepancies between expert and lay perceptions of environmental risk, the role of the media in amplifying and/or reducing discrepancies, and the effects of these discrepancies on policy responses.

Experimental studies (e.g., Slovick 1987; Gregory 1991) have demonstrated that experts assess environmental risk as the product of the likelihood of occurrence and the magnitude of a hazard (i.e., the individual and social consequences of its occurrence). Lay people, however, generally consider other factors, such as the familiarity of a risk, the degree of control or "voluntariness" associated with exposure to the risk (e.g., smoking's perceived riskiness is reduced by the fact that it is a voluntary activity, while nuclear power's riskiness is increased by the fact that those potentially exposed cannot control their exposure), and the uncertainty or "unknowability" associated with the risk (e.g., the perceived riskiness of automobile accidents is reduced because their physical consequences are well-understood, while the riskiness of exposure to toxic waste is increased because the consequences are less well-understood and less certain).

Studies which address the role of the media in environmental risk communication (e.g., Sandman et al. 1987; Krimsky and Plough 1988) indicate that the media (including press and broadcast organizations) tend to give more coverage to novel and less well-understood risks, to emphasize potential impacts rather than the likelihood of their occurrence, and to highlight scientific and policy controversy and uncertainty rather than areas of agreement. Sandman et al., in a study of environmental risk reporting by New Jersey local newspapers, generally did not find intentional bias or distortion in the presentation of risk issues, but did find tendencies to rely on government and industry sources more than on scientific, environmental group or citizen sources (Sandman et al. 1987:8-11).[3]

The impact of media coverage on public or decision-makers' risk perception has not been rigorously studied. Methodologically, it is difficult to isolate the impact of press "signals" about risk from other sources of risk information (e.g., interpersonal communication, socio-cultural assumptions), and difficult to link the flow of information to changes in audience cognition, affect or behavior (cf. Dunwoody and Neuwirth 1991). Researchers at Clark University have proposed a model of "social amplification of risk" that includes consideration of media coverage, but this model is still under development (Kasperson et al. 1988).

Preliminary work on the role of the media in communicating *global* environmental risks suggests that the media's impact on perception of these risks may be significant, but further empirical study is necessary (cf. Kasperson et al. 1990). Schneider (1989), in an impressionistic account of media coverage of global climate change, argues that the media are preoccupied with "their four Ds: drama, debate, disaster and dichotomy" (p.217), and that media attention to the global climate change issue surged only when the 1988 drought in the US and dramatic Congressional testimony by a NASA scientist created suitable "news pegs" for the story.

Wilkins and Patterson (1991) argue that the dramatic drought transformed global climate change from a science story whose political implications were not well conveyed by science writers into a political story whose scientific basis and subtleties were not well conveyed by political writers. They conclude that failures in media coverage prevented the global climate change issue from securing a place on the US policy agenda. Dickson and Clark (forthcoming), in contrast to Wilkins and Patterson (1991), argue that press coverage in the US helped stimulate a policy response which in turn established global climate change as an ongoing public issue suitable for further coverage. Neuzil (1992) argues that press coverage of global climate change was constrained by press dependence on government and scientific sources, coalition-building among scientific, environmental and nuclear industry actors which narrowed the debate on the risk to fossil fuel use and, again, the need for a dramatic event as a news peg.

Kasperson et al. (1990) review international press coverage and public opinion data on global climate change and ozone depletion in comparison with other environmental risks, and conclude that while the salience of global environmental issues has increased in both press coverage and in public opinion, publics still do not understand these issues well, do not rank global issues high on their agenda of environmental concerns, and are unlikely to mobilize in support of policy initiatives on these issues.

For this study we assumed that:

- there are significant differences between lay and expert environmental risk perception, and that these differences may impede policy development unless they are recognized and addressed by the press and other actor groups;

- institutional constraints on press coverage of global environmental risks (e.g., differential access to and reliance on actor groups as sources, limits on press organizations' internal scientific and policy analytic capacity) will affect press communication of these risks, but the way in which these constraints affect risk communication is a subject for empirical investigation;

- the effect of risk communication through the press on public opinion and policy development is unclear; and difficult to disentangle. Its illumination is important, but would require methods and data sets beyond the scope of the present analysis.

2.2 Case Selection

As noted above, we undertook the study reported here as part of a larger project on "Social Learning in the Management of Global Environmental Risks," involving scholars from eleven countries around the world.[4] This study complements the Social Learning Project by providing an in-depth analysis of the role of the press in the overall social learning process. In particular, it explores the press's role in *selecting* for attention a subset of available events, ideas, and perspectives, and in *diffusing* this perspective through society at large.

The larger Social Learning study examined the global environmental issues of climate change, stratospheric ozone depletion, and acid rain. This study focuses on the acid rain case. The definition of "acid rain," for the purposes of this study, has been, "Air pollution that travels long distance and harms valued environmental assets as a result of direct acidic or corrosive effects, or through mobilization of harmful chemical reactions." This definition encompasses the evolution that the term "acid rain" has gone through since the late 1960s: sulfur that acidifies lakes and kills aquatic life, sulfur and nitrogen that acidifies soil and kills terrestrial vegetation, (and corrodes materials), and nitrogen and other ozone precursors that harm vegetation, materials, human health, and visibility. In short, it includes acid rain and tropospheric ozone that is caused by long-range transport of pollutants. This definition excludes acidification and ozone-creation problems that are caused by purely local transport mechanisms. Today, the "acid rain problem," like many other environmental problems, has come to be understood by scientists as encompassing both local and long-range phenomena. This complicates the analysis, but also constitutes a real-world challenge of problem identification and portrayal with which the press has been confronted.

We selected the acid rain issue for detailed examination in this study for several reasons, including the range of debates it has spurred within the scientific community, the transnational issues it has raised, and the relatively high volume of media coverage this issue has received. The acid rain issue has high international salience, significant economic and social implications in its own right. It possesses the characteristics of:

- technical complexity;
- scientific uncertainty about causal mechanisms, the intensity and distribution of impacts in space and time;
- a range of possible policy responses, including options to prevent, offset or adapt to potential impacts;
- high potential for policy responses (including the "no action" response) to lead to substantial redistribution of resources within and among social actor groups and countries.

Perhaps most significantly for our purposes, acid rain is one of the most "mature" global environmental issues, at least for the North America and Europe. Appendix 1 includes a summary of the science of the acid rain problem as it is understood today, the present state of regulation, and an account of its early emergence. (It follows the last chapter of this book.) National efforts were made to place it on the international policy agenda as early as the 1972 Stockholm Conference on Environment and Development. Twenty years later, at the time of the Rio follow-up to Stockholm, the nations of both Europe and North America had developed coordinated policies to address the problem. Emissions of at least some acidifying chemicals were declining. By studying the history of acid rain over the period of 1972-1992, we therefore have an opportunity to see how press coverage changes as an international environmental issue first emerges onto the agenda, becomes a focus of high level policy debates, and finally retreats into the background as a problem seen (however temporarily) to be under control.

Our selection of countries to compare in our study of acid rain and the press was largely dictated by concerns that had already shaped our larger social learning program. There, we confined ourselves to industrialized countries simply because it was the easiest place to start. We found that the difficulties of designing a rigorous, empirical research protocol that could be systematically applied both to developing and developed countries were simply overwhelming. Within the developed country group,

we sought variation in the national political cultures, plus the nature and degree of the countries' involvement in the acid rain debate. When these criteria were crossed with the availability of a study team that could address the issues that concerned us within the relatively short period of this initial study, the result was selection of Canada, the United States, Germany, the Netherlands, Hungary and Japan. Background data on these countries is provided in Table 1. Names and institutional affiliations of individuals responsible for the individual country case studies are given in Table 2.

We focussed on elite daily newspapers as one dimension of the "press" that would be comparable across our selected countries and over the entire 20 year time period of interest. Elite daily papers serve as primary news sources for leaders in each of the actor groups, have a substantial impact on public opinion, and are generally well-archived. We excluded television or radio in the study primarily because national indexing and archiving of these media is very uneven among the countries studied, and is almost nonexistent for the early parts of the study period. In addition, our preliminary analysis of media coverage on global environmental risks has suggested a relatively high degree of congruence between the content of press reporting and reporting in other media.

The focus in the present chapter, as in this book as a whole, will be solely on newspaper coverage (Bogart 1981; Kubas 1981; Carter and Greenberg 1965). There are various justifications for not looking here at other media. While there is no doubt television is most popular for *entertainment*, many individuals use newspapers at least equally, and perhaps more seriously, for *news* (Bogart 1981; Clarke, Jenson, LeDuc, and Pammett, 1979). Moreover, studies have suggested that newspapers are a more frequent or important source, in particular, for *science-related* and *environmental* issues (Wade and Schramm 1969; Rankin and Melber 1980). Acid rain certainly fits into this category. Finally, studies of the extent to which the mass media play an "agenda-setting" role also emphasize the importance of newspapers. Compared to television or radio, newspapers appear to be more influential in determining those issues that are picked up and become part of the public policy agenda (McLeod, Becker, and Byrnes 1974; Tipton, Haney and Baseheart 1975; Benton and Frazier 1976). Our study has not been designed to shed additional light on these prior findings regarding the relative role of daily newspapers and other media. We have no doubts, however, that a more comprehensive study of media-policy interactions in the global environmental arena would have to include an understanding of the role of elite daily newspapers.

What characterizes the *elite* press? They are concerned, knowledgeable and serious: the papers that thoughtful people and opinion leaders read seriously, the papers found in good libraries the world over. They appeal to reason and logic. "They have a basic concern for "quality, enlightenment, credibility, and wisdom." (Merrill 1968, 38.)

In each of the six countries two or three newspapers stand out as journals of elite opinion, catering to the intelligentsia and the opinion leaders. Well informed on government matters, they achieve a reputation for reliability, for expert knowledge, and even for presenting the most accurate image of governmental thinking. They are not necessarily the ones with the largest circulation. Their influence is significant however, for they are read by public officials, scholars,journalists, lawyers, and business leaders. They are also read in other countries by those persons whose business it is to keep up with world affairs.

To keep our study manageable, we focussed attention on a single elite paper from each country. In selecting specific papers we sought ones that would likely be read on most days by most elite policy people in the country. When multiple papers met this criterion, we sought to select one with a reputation for relatively centrist political leanings and an editorial policy that would create reasonably extensive coverage of the acid rain issue. Table 3 provides a list of the newspapers selected. Each

country team coded a sample of the articles on acid rain published during the study period (see below) and conducted interviews with officials, scientists, activists, journalists, editors, and others to deepen and provide context for the analysis.

2.3 Methods

The core of our analytic approach was a content analysis of selected articles on acid rain published in the elite daily newspapers of our case study countries. Articles were identified using computer databases, paper indices, and paper archives to locate items on acid rain. These articles were analyzed quantitatively and qualitatively to illuminate the four classes of questions listed below. These were designed to probe the role of the media in the policy process and to explain variations across time and country, as well as the interplay among the key variables we have identified.

Timing: What was the timing of press coverage of the acid rain issue? Did press coverage lead or follow political or scientific concern? How was the timing of coverage in different countries related?

Framing: "Framing" captures the broad orientation and context of the article and its general bias with respect to problem perception and source representation. It address questions including, how was the acid rain issue "framed" by the press in each country (i.e., In what context was it placed? With what other policy issues was it associated?) How did this framing vary across time and countries?

Slants: Was there a slant in the coverage toward either a "wait and see" approach or a more proactive "action now" approach? Did journalists convey a bias in favor of, or against, industry, environmental organizations, or government?

Sources: Who were the principal sources used by the press to report on the acid rain problem? Did any group -- scientists, environmental non-governmental organizations (ENGOs), government officials, industry, or other media -- dominate coverage? Did one "position" (e.g., wait-and-see versus act-now)? How did use of sources vary across time and countries?

Interviews were conducted with editors and journalists responsible for coverage of the acid rain issue by the selected newspapers over the study time period, and with representatives of other actor groups directly involved in the issue. The interviews helped to clarify the organizational incentives for and constraints on press coverage. They also provided "behind the scenes" detail on how interaction between journalists and other actors shaped individual stories and long-term editorial perspectives on the acid rain issue.

Our approach to these questions was operationalized in a detailed research protocol used by all teams in the study. The research protocol consists of three parts:

a) a codebook directing the collection of data on individual press articles published between 1972 and 1992; results were recorded for analysis on a common database software.

b) a guideline for information to be compiled on each country's press in general;

c) a set of interview questions to be asked of the most important journalists and actor groups contributing to the coverage.

The full protocol is included as Appendix 2.

3 FINDINGS

The detailed findings of this study are presented in the individual country chapters that make the bulk of this volume. Here we summarize comparative findings based on pooling the data and interviews across the six countries. We highlight similarities and differences in coverage with special attention to our findings of synchronicity, framing/agenda-setting, biases in slants and sources.

3.1 Timing

Figure 1 traces the rise and fall of press attention to the issue of acid rain in the six countries we studied. For each country and its elite newspaper, we took the annual counts of articles dealing with acid rain in each year from 1972 to 1992 as reported in later chapters of this volume. We normalized these counts such that each country's year of maximum coverage was assigned a value of 100 percent, and all other years scaled accordingly. Several results are clear.

First, although acid rain has been around for hundreds of years and has been understood as a problem of long-range pollution transport since the beginning of this century, it status as a public issue meriting sustained press attention is primarily a phenomenon of the 1980s in most of the countries we studied. And in all countries studied, the pattern of press attention is essentially that of the "classic" issue attention cycle identified by Downs (1972) and since documented by many scholars (e.g., Baumgartner and Jones 1993): a long period of minimal or sporadic attention, followed by relatively rapid growth, followed in turn by a slower decline to lower attention levels. Our studies show that the amount of coverage by the elite daily press rises and falls in the same pattern as attention paid to the issue by parliaments and technical scientific news weeklies. Within a given country, the patterns are so similar as to rule out any simple argument about whether the press "sets," or merely amplifies, the public agenda.

The sequencing of attention cycles in press coverage of acid rain also warrants comment. The modern acid rain story was initially "launched" by the Scandinavian countries in the late 1960s and early 1970s. Local media attention in Scandinavia at that time failed to generate any significant interest by the press or policy makers elsewhere in Europe or in America. Among the countries we have studied, serious media attention appeared first in North America (Canada and the USA), then in Europe (Germany, the Netherlands and Hungary), and much later in Japan.

In Canada, the first articles on acid rain began appearing in 1977, with coverage rising rapidly to a peak in 1985. Early articles derived from a ministerial speech about acid rain as an "environmental time bomb" resulting from transboundary exchanges of pollution between the United States and Canada. Canadian science, drawing on earlier Scandinavian work, was the immediate source behind the ministerial declaration. Coverage rose rapidly, fueled by domestic recreational concerns and sustained by tensions with the United States regarding the trans-boundary components of the problem. Coverage finally dropped off only after the US finally indicated it would act to reduce its own acid rain emissions and was prepared to enter into a bilateral agreement with Canada.

The next country in our sample to experience a significant increase in coverage of the acid rain issue was the United States. There attention rose beginning in 1978, initially in response to Canadian political pressures but backed by growing concern in the US government, primarily fostered by independent scientists drawing on their professional linkages with Scandinavian acid rain researchers. After 1980, the debate surrounding the "Reagan Revolution's" attack on environmental regulation became centered on acid rain, fueling a rapid increase in press coverage. Both state officials concerned about the intra-national equity issues and representatives of the Canadian government

concerned about the transboundary flow of pollutants mounted energetic media campaigns on acid rain. Peak coverage in 1984 was almost certainly boosted by major elections that took place in 1984 in both the United States and Canada: both the transboundary and the intra-national dimensions of the acid rain problem were central campaign issues. Coverage dropped dramatically in 1985 to nearly half the number of articles published in the previous year. This decline was not, however, tied to any amelioration of the problem or any moderating scientific findings. Moreover, a domestic political consensus on action to combat acid rain did not begin emerging until 1988, and legislation to reduce acid rain was finally passed only in the early 1990s. By then, only a few articles were being printed each year.

European attention to the acid rain issue began to rise in 1981 when the German news magazine *Der Spiegel* printed a black and white image of fuming smokestacks and dying trees. There was no direct connection between the article in *Der Spiegel* and the North American coverage of acid rain, which by then was well advanced. Press attention was fuelled by a volatile domestic political situation in which green parties mattered. "First the forest dies, then man" became the rationale used to pressure the government to control the sulfur and nitrogen oxide emissions threatening the existence of Germany's forests, a threat which cut to the heart of the nation's cultural bond with its forests. Previously, the public had only been aware of local or regional damages due to air pollution, and policymakers had avoided any action which could have supported claims of the Scandinavian countries for acid rain damages which they were aware of since 1968. The core legislation to abate acid rain was discussed and passed during the peak phase, generating great media interest.

In the Netherlands, the press coverage of the acid rain issue grew steadily during the early 1980s, peaked around 1984 and decreased. The Dutch approach to acid rain was described by its Minister of Environmental Affairs as "Germany plus three months," a relationship that held in the press as well as in policy circles. This can be appreciated by noting that although the Netherlands has few forests, the image of forest dieback -- central to the German debate -- was important in the coverage of acidification by the Dutch press. The peak of media coverage is likely connected to a Dutch "anti-acidification" policy formulated in 1984, the result of a 1983 government study on the effects of acid rain. In 1985, a public education campaign on acid rain was initiated by the Department of Environmental Affairs. A temporary second peak in 1988 was largely attributed to the seemingly unique feature of ammonia-manure emissions and acid rain in the Netherlands. This feature was especially newsworthy because of the Netherlands' dense population and intensified livestock breeding. Even today these agricultural emissions continue to generate media interest, albeit a small volume. Nevertheless, by the end of the 1980s and early 1990s press coverage had clearly shifted the bulk of its attention to other global environmental issues such as ozone depletion and climate change. Dutch coverage of these issues was extensive.

Hungarian media coverage of acid rain was even more dependent on events and ideas developed elsewhere. During the early 1980s, Hungarian coverage -- though always extremely modest -- climbed steadily, tracking other European coverage to a peak in 1984 and declining somewhat irregularly thereafter. The increased attention during this period was primarily a response to increased attention elsewhere in Europe, both west and east. Little in the way of domestic impacts or policy debate developed on the issue, and no significant constituency had a stake in keeping domestic attention focussed on the issue when the overall level of European attention dropped. The declining concern with acid rain was accelerated by the exceptional media interest generated by public protests in Hungary against a major hydroelectric project on the Danube during the late 1980s.

Japanese press coverage of the acid rain issue lagged far behind that of North America and Europe. Three distinct phases of coverage can be discerned: acid rain emerged first as a local health issue

from 1973-1975; then as an international issue, with emphasis on Europe's widespread ecosystem destruction and US debates on the Clean Air Act until the mid-1980s. Eventually, the coverage began to shift toward the transboundary nature of acid rain and its effects on Japan, with China and South Korea cited as the main sources of Japan's problem. Here emphasis also shifted from health-related problems to damages to the ecosystem, mainly to forests and lakes. The overall level of public, policy and media interest remained, however, relatively low. In 1989 the picture changed and acid rain along with global climate change and stratospheric ozone depletion suddenly became major news issues. Media coverage of acid rain jumped. The change in media coverage was clearly tied to rising public and political attention to global environmental issues in Japan. This new societal and political emphasis on global environmental issues directly reflected a major commitment made by Japan's political leaders in the late 1980s to strengthen Japan's role in resolving global-scale problems.

It would be relatively easy -- and is in fact general practice -- to construct ad-hoc theories of issue dynamics for global environmental concerns that assume either that attention rises and falls everywhere around the world at the same time, or that it does so independently in all countries. The first approach would necessarily entail some sort of linkage mechanism such as global media coverage, dissemination of scientific findings, or the impact of international organizations or visible events -- that synchronized national agendas. The latter would emphasize mechanisms dependent on particular national characteristics such as electoral politics or key local leaders and interest groups. Our data show that neither of these relatively simple explanatory approaches is likely to account for reality. Instead, good general theories of the role of the press in issue dynamics will have to be cast in terms that let it explain why some countries experience simultaneous outbreaks of press attention on specific issues, while others do not.

In particular, this study calls for theory that would explain how the timing and relative magnitude of press coverage on the acid rain issue was:

- relatively tightly synchronized across countries within North America, and within Europe;

- weakly synchronized between North America and Europe; and

- unsynchronized between Japan and either of these western regions.

Moreover, our analysis suggests that a good general understanding would have to show how acid rain was pushed onto the national agenda of some countries by scientists, of others by the media, of others by domestic political leaders, and of still others by international political concerns.

We turn next to some additional comparative findings of our study that might help to inform such theory.

3.2 Framing

How was the acid rain issue "framed" by the press in each country? We addressed this issue through four subsidiary questions:

- In what geographic context was acid rain considered placed?
- What were the dominant causes associated with acid rain?
- What were the dominant impacts attributed to acid rain?
- What options were focused on to respond to acid rain?

Our analysis of how answers to these questions varied across time and countries suggests that the acid rain problem, though understood in much the same scientific terms throughout the world, took on a unique face as a socio-political issue in each of the countries we studied.

3.2.1 Geographic Focus

For each of the articles on acid rain analyzed in this study, we asked whether its geographic focus was primarily domestic, foreign, or mixed, in the sense of emphasizing the domestic implications of transboundary pollutant flows.

Not surprisingly, we found that the elite press in all the countries studied was aware that the acid rain issue was being discussed elsewhere in the world. Everywhere, the press at least touched on foreign developments. Two different geographic orientations nonetheless emerged from the analysis.

In Germany, the Netherlands, and the United States the majority of press coverage was focussed domestically. From the onset, the acid rain debate in Germany was tied to that country's forests, its "green" politics, and its emerging program of environmental regulations, particularly discussions over catalytic converters for automobiles. In the Netherlands press coverage of the acid rain problem, once imported from Germany, was framed as a unique ammonia problem posed by intensive cattle breeding. In the US, despite heavy Canadian pressure from outside, the acid rain issue was increasingly treated as a domestic political story framed in terms of regional equity issues and the battle between environmentalists and the anti-regulatory Reagan Revolution.

Press coverage of acid rain in Canada, Hungary and Japan was, in contrast, much more externally focussed. For Canada, acid rain was an international story in the sense that it was seen largely as a problem of transboundary pollution imposed on Canada by the United States. In Hungary, the relatively high number of articles in the "non-domestic" group can be attributed, firstly, to the Hungarian state newspaper having correspondents located in all Eastern European socialist country who monitored issues on the public agenda in these countries. Thus, when the issues of forest dieback and acid rain entered the debate in Germany and Czechoslovakia, correspondents covered the issues. Secondly, given the Hungarian blend of political ideology and pragmatism with respect to environmental protection, journalists may have considered it prudent to report that other countries faced even more serious problems than Hungary. In Japan, over half of the articles treated acid rain as a foreign problem. The first article mentioning possible acid rain damage in Japan from Chinese emissions appeared in 1985, soon after the peak coverage of acid rain problems in Europe and North America. It is clear that parallels were being drawn between the situation in Europe and North America and what might be happening in Northeast Asia.

These groupings confound simple expectations, with big countries appearing in both groups (e.g., Canada, United States), and countries mostly affected by other's acid emissions in both groups (e.g., Netherlands, Japan).

3.2.2 Causes

Throughout our study period the long-range transport of acid rain was portrayed in most of our countries as a problem caused primarily by electric utility plants, with a strong focus on the sulfur dioxide emissions of coal burned in those plants. Transportation emissions of nitrous oxides were generally treated as an important, but secondary, source. Generally, it was smokestacks, not tailpipes, that newspaper cartoonists used to portray the problem. Beyond this general pattern, however, distinctive national profiles of press coverage stand out.

In the United States, for example, reporting was exceptionally preoccupied with coal burning utility plants as a cause of acid rain. Automotive sources were rarely discussed. This newspaper focus on coal, however, reflected the preoccupation of the policy debate. In the US, framing of the acid rain problem was grounded in the intense policy debate that had been underway throughout the 1970s over the role of coal in a national energy policy and, particularly, the prospects for burning coal in ways that would meet *local* standards for ambient air quality and emissions. Automotive emissions, in contrast, had been tackled by regulators in the 1960s and 1970s and -- while hardly under control -- were contested in another arena.

German reporting, in contrast, focussed on automobile sources of acid rain especially from the late 1980s onward. Again, this reflected the preoccupations of the national policy debate. Questions of when catalytic converters for automobiles would be introduced in the European Community were a major focus of policy debate at the time, and acid rain fit right in as a "problem" that catalytic converters would "solve." Moreover, German Greens had been reluctant to make too hard a case against coal, both because this could alienate alliances with the labor movement and because it might strengthen the hand of Germany's nuclear energy lobby. The press mirrored this selective framing of the public policy debate.

Agricultural activities played a unique role in framing the Dutch acid rain debate. During the period of this study, the number of Dutch livestock increased significantly. Unlike Dutch meat, eggs, and dairy products however, animal manure was not exported and a large surplus accumulated. By the late 1980s and early 1990s, ammonia emissions from manure were treated as a prime cause of acidification, both in the policy debate generally and in the elite press.

In Canada metal smelters, particularly the Inco smelter in Sudbury, Ontario, became the focus of debate early on when scientists linked them to acidification of lakes in Ontario and Minnesota. Again, this framing of the acid rain debate reflected prior history of air pollution debates in the country. Transboundary pollution disputes between the United States and Canada had traditionally focussed on smelters. And a significant interest in cleaning up the smelters existed prior to the advent of acid rain concerns, which became yet another reason for getting on with the task.

Finally, in Hungary, "general industrial" emissions are mainly responsible for the high counts in the "other causes" category of our analysis. Our study suggests that most news articles avoided singling out power plants as the emission source, including them instead under the rubric "industrial emissions," for a number of reasons. These included the strong political influence of the country's coal industry, the privileged social and political status of coal miners, and the energy sector's overall importance in policy matters. Then too, Hungarian soil scientists mainly attributed soil acidification to agricultural mismanagement, particularly improper fertilization practices.

In conclusion, we observe in our national case studies a shared framing in which all countries recognize coal fired utility plants as a cause of acid rain. In addition, however, each country's policy debate in general, and its news coverage in particular, singled out additional locally salient causes for special attention and emphasis.

3.2.3 Primary Impacts

The public health and welfare concerns that had dominated most local air pollution discussions in the 1960s and 1970s were relegated to secondary importance with the recognition that long-range transport of acid rain could endanger remote ecosystems. Press coverage in all our countries recognized that both aquatic and terrestrial ecosystems could be affected. Different countries, however, focussed on different impacts.

The Scandinavian concerns for acid rain that had first brought the issue to the international agenda in the early 1970s were focussed primarily on aquatic impacts. Canada, the first country in our sample group to elevate acid rain to its domestic agenda, shared both this aquatic impact focus and the underlying geology that had rendered some Scandinavian lakes and streams so vulnerable to acidification. So did the northern portions of the United States where that country's concerns first surfaced. The fact that the affected North American aquatic systems were popular resort and recreational areas no doubt contributed to North America's rapid politicization and heavy press coverage of the acid rain issue.

In contrast, coverage in our European countries focussed on forest damage as the principal impact of acid rain. This frame initially emerged in Germany. There, "Waldsterben" -- forest death -- was the topic of the initial article in *Der Spiegel* that launched acid rain onto the German political agenda. It continued to be the dominant image associated with acid rain in Germany throughout the period of our study. The influence of German debate on acid rain was so strong that Dutch reporting on possible impacts was also dominated by images of forest death, despite the absence of much observable damage of forests in the Netherlands. Much the same occurred in Hungary, where press emphasis on forest impacts was generated by reports about dying trees in Western Europe, Poland, Germany, and Czechoslovakia, rather than the decade long debate between foresters and ecologists in Hungary.[5]

Europe's preoccupation with forest impacts eventually diffused beyond the continent. By the mid-1980s Canadian reporting had expanded beyond its early focus on aquatic impacts to devote increased attention to dying maple forests in Quebec. Our study suggests that this was due less to compelling new scientific evidence than to reporters and editors looking for "new angles" on what was becoming, by then, an old story. The Japanese press likewise managed to find by 1986 stories about cedar trees in the northwestern Kantô Plain, near Tokyo, dying from acid rain.

The American situation is more complex. After its initial emphasis on aquatic systems, the US press reported on a wide range of possible acid rain impacts throughout our study period. Though at a regional level specific effects often dominated the debate, no nationally significant constituency emerged around any particular effects area. The American press coverage of acid rain impacts nonetheless did coalesce around a single powerful image. This was not one of individual impacts but rather of the acidity of precipitation per se: dissolving umbrellas became the dominant motif for newspaper political cartoonists. For all the scientific controversy on the subject of acid rain's effects, a broad "common sense" consensus seemed to emerge early on that too much acidity falling from the sky was a simply a bad idea, and that something should be done about it.

Two dominant impressions emerge from our comparison of how the impacts of acid rain were treated by the press in our sample countries. First and most important, where specific impacts were observable and relevant to important domestic groups, the press and the political system strongly interacted to give those impacts visibility and amplification (e.g., Canadian lake damage and German "Waldsterben"). Second, in the absence of such immediate relevance, a substantial "spillover" effect was evident with strong impacts coverage in one country providing a seed or catalyst around which grew impacts coverage in other, especially neighboring countries. Finally, the US evidence suggests that we may have misspecified our research protocol by (pre)defining possible impacts categories rather too much in the ways those categories were established by the scientific community. It may be that a less structured analysis would have found other countries' newspapers also reporting in terms of less technical, more encompassing impacts such as the American's "acidity."

3.2.4 Options

Policy or response options constituted a fourth aspect of issue framing explored in this study. In essence, we wanted to know what kinds of possibilities for dealing with acid rain were reported by the press, and whether these possibilities varied systematically across time or countries. Specific options addressed in articles were coded in one or more of the following categories:

1) technological options, targeted on emission reduction (e.g., filters)
2) technological options, targeted on impact mitigation (e.g., liming)
3) rules or regulations, targeted domestically (e.g., emission caps)
4) rules or regulations, targeted internationally (e.g., treaties)
5) incentives (e.g., emission taxes)

For all our countries, both national policy debates and the press coverage of those debates exhibited a general tendency to focus on emission reduction rather than impact mitigation. Measures designed to mitigate impacts such as liming, fertilizing, or breeding resistant species received little attention in any of the countries we studied, either in the press or in actual government action.

The group of countries we had already identified as framing the acid rain problem in "foreign" (i.e., not exclusively domestic) terms were, not surprisingly, preoccupied with policy options involving international or bilateral rule making. Canada consistently pushed for an international agreement committing the US to pollution controls. Japanese discussion of policy options reflected its concern about possible foreign markets for Japanese low pollution technologies, and about mitigating the long-range transport of emissions from China.[6] For each of these countries, the national policy focus on international relationships was matched by the orientation of newspaper reporting.

In contrast, the policy debate, and press coverage of it, in Germany, the US and the Netherlands focussed primarily on domestic measures. This was in keeping with the "domestic" geographical focus of their overall discussion of acid rain as documented earlier. Generally, these countries with a domestic focus to their policy debates engaged in more detailed discussions of specific policy alternatives.

Beyond these broad generalizations, few patterns in coverage of policy options emerged in our study. Instead, each country's debate evolved in ways tightly tied to particular characteristics of its own domestic political circumstances. In Germany, for example, there was essentially no public debate about whether to use a particular technology to reduce the emissions. The tenor of the press coverage was that fossil fuel combustion plants would be equipped with desulfurization and denitrification systems, and that all automobiles eventually would be equipped with the three-way catalytic converters, while other, weaker technologies are only suitable as an interim solution and for refitting old cars. Once defined in this way, the debate on policy options centered on the details of the relevant regulations to be introduced.

In the US, during the 1980s the major focus was on emissions standards for power plants, technologies to reduce emissions in power plants through the use of scrubbers, fuel switching to low sulfur coal, and to a lesser extent on lawsuits. By the 1990s, the main focus shifted from domestic emission standards to discussion of emissions technologies. Increased interest in financial incentives occurred in the late 1980s and early 1990s. Legislation passed in 1990 gave states the flexibility to reduce sulfur and nitrogen emissions in the least expensive way by allowing the use of market-based incentive mechanisms.

3.2.5 Conclusion: The dominant frame for each country differs

When the results are aggregated across countries, it becomes clear that, although many elements of issue framing are shared by two or more countries, each country ultimately framed the acid rain debate in a unique and characteristic way. The particulars of this country-specific framing were dictated primarily by domestic politics and political culture. As a result, despite a broadly shared international understanding of acid rain as a scientific issue, acid rain emerged as a significantly different policy issue in each country we studied. In particular:

- German coverage linked acid rain to the nation's much loved forests.
- Japanese coverage focused on questions of health, linking acid rain with Japanese environmental crisis of the 1960s which had caused substantial health problems.
- Coverage in Hungary prior to the fall of communism linked acid rain to broader political opposition, challenging the communist tenet that environmental degradation was solely capitalist problem.
- The Canadian coverage had a similarly political agenda, though its focus was on the nation's relations with the United States.
- In the US the intra-national jobs versus environmental protection dimensions of the acid rain problem were central campaign issues.
- In the Netherlands the unique ammonia problem posed by intensive cattle breeding dominated by the late-1980s.

3.3 Slant

Did elite newspapers in the countries we studied convey particular "slants" in their coverage of the acid rain issue? Given the "frames" they adopted for their coverage, did the papers enter the acid rain debate as advocates, critics, or as relatively neutral reporters of what others were doing?

We addressed these issues of the "slant" given by reporters to their acid rain stories in two ways, asking questions about "action" and "actor" bias in newspaper articles.

3.3.1 Action Bias

First we coded articles according to the view they conveyed on the need for action regarding acid rain. Each article was classified as conveying a bias for immediate action, a bias against immediate action (e.g., "wait and see"), or a neutral stance with regard to the need for action.

Results divided our sample countries into two distinct groups. In the US and Germany our elite newspapers consistently struck a neutral stance with regard to the need for action on acid rain. Only a few articles with a proactive stance (no more than one in seven or eight) and virtually none with an overt wait-and-see orientation appeared throughout the study period.

In contrast, the majority of articles published in our other countries reflected a distinctly proactive slant. This was extreme in the case of Japan, but also true for the Netherlands and Canada, both of which exhibited a bias for immediate action in more than two-thirds of all articles published in most years. Hungary's coverage was proactive about as often as it was neutral, but still much more proactive than either the US or Germany.

As we have suggested, the underlying policy debate in the countries of our study differed substantially. Care must be therefore exercised in the interpretation of our "action bias" data. In

fact, both the US and Germany experienced deep and prolonged domestic debates on what should be done about acid rain. Through much of the study period, it would have been easy for a journalist to find serious advocates for both the proactive and wait-and-see positions. A "neutral" article tone could therefore have resulted from simply reporting the strongly held views of both sides in the debate.

In Japan, the Netherlands and Canada, in contrast, a social and political consensus emerged early on that these countries would benefit from action to control acid rain.[7] Through much of the study period, it would have been hard for journalists to find a serious (domestic) advocate for the "wait and see" position. A "proactive" bias could therefore have resulted from simply reporting the strongly held views of most participants in a rather one-sided debate.

Even when these differences in the policy debates journalists were reporting are acknowledged, however, the commitment of US and German elite papers to neutral reporting still stands out. For during the period of our study, both Germany (with the 1983 Large Combustion Plant Regulation) and America (with the 1990 Clean Air Act Amendments) passed from a period of intense controversy on acid rain to one of broad national consensus. This change was, of course, reflected in the news stories of the day in both countries. But it did not show up in our data on action bias. Whether there was broad consensus or not, elite newspapers in both countries continued to cultivate a balanced and thus "unbiased" approach to the acid rain problem. Whether this stance served society better than the proactive reporting in the proactive nations remains an open question.

3.3.2 Actor Bias

For our second look at reporting "slant" on acid rain stories, we coded articles according to the view they conveyed with regard to particular groups of actors in the acid rain debate, in particular government, industry and ENGOs. Each article was classified as conveying a bias in favor of each actor (i.e., portraying that actor in a positive or sympathetic light), a bias against each actor (i.e., portraying that actor in a negative or critical light), or a neutral stance with regard to each actor.

The overwhelming finding of our analysis is that the elite newspapers in our sample countries were generally unbiased in their treatment of the various actors in the acid rain debate. They did not, in general, either demonize or lionize government, industry, or environmental organizations.

The major exception to this pattern is the negative light in which Canadian newspaper articles cast the US government. Canadian press coverage of the US government was decidedly and consistently negative. Articles, especially those quoting Canadian ministers, talked about "literally dumping your garbage on our country" and about the US "causing a 'rain of death' on Canada." The Reagan administration in particular was harshly criticized. It was accused, for example, of "blatant efforts to manipulate [the work] of scientists" and of "destroying 70 years of cooperation on pollution between the two countries." Again, it is difficult to separate what was a negative attitude on the part of newsmakers and what a negative attitude of newspapers. But while the official rhetoric became a good deal less harsh during the years of the Mulroney prime ministership (1984-93), the media coverage did not. It seems safe to conclude that whatever norms the Canadian press had adopted with regard to neutral treatment of domestic actors, these did not apply to foreign enemies.

Beyond this, most of the newspapers we studied exhibited a slightly positive bias towards ENGOs in the late-1980s and early-1990s. Notably, no significant bias against industry was found in any of the countries at any time during our study period.

3.4 Sources

Source selection is generally accepted to be one of the most powerful, and subtle, tools with which the media can shape political debates. We therefore analyzed which sources were selected by our sample newspapers for their reporting on acid rain. In particular, we coded each article for whether it cited sources from government (domestic or foreign), academia, environmental NGOs, or business. If an article cited multiple sources, it was coded as such.

We found that reporters from our sample newspapers were most likely, by far, to rely on government officials as sources for articles on acid rain. For most of our countries, in most years, at least half -- and often two thirds or more -- of the sources cited by the elite newspapers were government representatives. The least cited source was business and industry, which seldom constituted as much as 10 percent of all sources. Citation rates for individuals from academia and nongovernmental institutions were more variable, but almost without exception lay between the extremes of government and industry.

The dominance of governments as a source for acid rain stories is not surprising. Several previous studies have found the same pattern. Government sources were especially attractive to reporters when they were heads of government. In America's *New York Times*, for example, President Reagan and Canadian Prime Minister Mulroney were cited more frequently than any other individuals. The one exception to this general pattern of government dominance of the news raises some interesting questions: Hungary, with a government controlled press for most of our study period, was in fact the country least dominated by government sources. Instead, its elite newspaper placed exceptional reliance on independent scientists to tell the acid rain story. The reverse was true in democratic Canada, where reporters deferred to government officials over scientists as news sources on acid rain in a ratio of nearly 20:1.

Why governments dominate the news, with academics, ENGOs and -- especially -- industry lagging far behind is an important question that this study has not satisfactorily resolved. Some contributing factors have nonetheless been suggested by our analysis. To judge from our interviews and data on the form of cited source material, the availability of press releases and timely responses to telephone calls plays an enormous role in deciding whose views make it to the elite newspapers. Governments excel at such activities. In many ways they are in the business of producing news. Their press conferences and reports were repeatedly cited in the articles we reviewed. They have press offices. They are often what the news is about (i.e., what governments are or are not doing). And they are often where the reporters are based.

In contrast, industry was neither particularly accessible nor quotable in the acid rain debate. Interviews in our sample countries several times recorded observations by reporters and editors on how difficult it was to secure usable, timely industry input for their stories.

Further support is given to the availability explanation for news sources by our Dutch data. In the Netherlands, environmental organizations received over a quarter to the source citations -- a rate more than twice that of other countries. This was almost certainly due in part to a monthly press conference that environmental groups organized, and that drew the attention of a large number of journalists. Beginning in 1984 these press conferences were used to issue a list of the ten most polluting companies in the Netherlands; the electricity plants and refineries were normally high on this listing. The list was especially effective in generating news and in pressing policy makers to act. These press events also provided opportunities to criticize weaknesses in the government's acid rain policy. Regular meetings with the press also fostered understanding between the environmentalists and the environmental journalists and opened communication channels.

Environmental organizations generally secured more press coverage of their views in the late 1980s than in the early-1980s. This almost certainly reflects their general maturing, as many ENGOs developed staff with credible knowledge of acid rain and an ability to talk to the media about complicated scientific problems. There were some other shifts in source frequency over time. During the 1970s, when the media viewed acid rain as a scientific issue, many of the sources cited in articles were academics. As politics became more central to the issue, government officials came to dominate as story sources. This finding underscores the results of other studies that have shown that the public first learns about environmental problems as science issues, which then become transformed into political stories.

4 RESEARCH AGENDA FOR ISSUES RAISED

In all the countries we studied, elite newspaper attention to the acid rain issue rises and falls in classic "issue cycle" form. Moveover, the national cycles of newspaper attention we have documented here match closely the rise and fall of attention paid to acid rain by governments and the technical press in each country.

We discovered, however, interesting patterns in the sequencing of attention among countries. These patterns exhibited neither total synchrony among nations in their response to acid rain, nor total independence. Instead, national attention cycles were synchronized among some nations' but not others. In particular, within the group of countries we studied, acid rain moved onto the national agenda first in North America (Canada and the US), shortly thereafter in Europe (Germany, the Netherlands, and Hungary), and much later in Japan. For each of these groups, the proximate "trigger" for the initial increase in policy and media attention was different: a science-driven ministerial pronouncement in North America, a graphic magazine article in Europe, and an international-relations driven government decision in Japan. Newspaper reporters were clearly aware of developments in other countries, both within and between these groupings. The articles they wrote, however, were predominantly domestic in focus. Reporters also made a modest amount of group linkages in their writing (e.g., articles in the Dutch press referring to the situation in Germany). Very seldom, however, especially during the peak periods of coverage, did reporters draw analogies across groups (e.g., German articles discussing the acid rain situation in North America). The most obvious explanation for these patterns is that direct, tangible connections among countries -- in this case connections via pollution flows and, in all likelihood, a variety of physical proximity considerations -- carry a lot more saliency for the media and society in general than do distant analogies, however graphic or scientifically justified. However global environmental issues may be in the eyes of science, this study would seem to confirm the adage that most politics and most news remains relatively post-hoc and tentative. Their robustness and generality will have to be evaluated in the light of other studies on other global environmental issues.

Good general theories of issue dynamics will have to be cast in terms that let it explain why some countries experience simultaneous outbreaks of press attention on specific issues, while others do not. We suspect that such theories will need to encompass not only the role of the media, but also the roles of other important social actors. Our study suggests that conventional debates about the "agenda setting" or "gatekeeping" roles of the press are unlikely to be productive if pursued in isolation of a broader, international understanding of issue definition and emergence. In our cases, the press served as a catalyst for issue emergence in some countries, but more as an amplifier and diffuser in others. The intimate interactions among the press, the political process, and the development of scientific understanding makes any attempt to isolate individual contributions to issue dynamics highly problematical.

Our study suggests that understanding international patterns of issue evolution requires in turn an understanding of how the media "framed" the acid rain issue with other political, economic or social issues. These frames were dominated by domestic politics and environmental circumstances. For instance, while German coverage linked acid rain to the nation's much loved forests, Japanese coverage focused on questions of health, linking acid rain with Japanese environmental crisis of the 1960s which had caused substantial health problems. Coverage in Hungary prior to the fall of communism linked acid rain to broader political opposition, challenging the communist tenet that environmental degradation was solely capitalist problem. The Canadian coverage had a similarly political agenda, though its focus was on the nation's relations with the United States. In the US the intra-national jobs versus environmental protection dimensions of the acid rain problem were central campaign issues. In the Netherlands the unique ammonia problem posed by intensive cattle breeding dominated by the late-1980s.

These extreme differences in the local framing of a global environmental issue poses serious challenges to international negotiations. Countries all gathered around the table to talk about their common problem of acid rain is one thing. The same countries discovering that they are actually talking about an immense range of different local political interpretations is another.

Our study found that the elite newspapers studied did a remarkable job of reporting in an unbiased way the broader social debate over acid rain. While it is true that many papers adopted a proactive stance towards acid rain regulation, this occurred in precisely those countries where the broader debate was proactive, i.e., there was a substantial consensus on the need for action. Where there was no such consensus, newspaper coverage was neutral. Likewise, fairness was the rule in portraying the positions of various actor groups. With few exceptions, the press did not favor one group over another, or criticize one group out of proportion with others. Frequently voiced fears of a green, or conversely, establishment bias in the elite media appear misplaced, at least for the acid rain issue.

Our data on source selection shows that availability matters everywhere and matters a lot. Government was the easiest place to get the news on acid rain, and it became the dominant source in all six of our sample countries. Reciprocally, industry was the hardest place to get the news, and it was underrepresented as a source. Interpretation of the results suggests some messages for would-be sources of news articles and perhaps for readers. Those interested in reforming media coverage of science laden issues may do well to concentrate less on reforming the media and more on preparing and presenting to the media usable versions of their views.

The comparative national approach adopted in this study has been virtually unique. A number of shortcomings in its coverage and empirical design will have to be overcome before it can counted upon to produce reliable, testable propositions regarding the role of the press in global environmental change. Nonetheless, by beginning to analyze the institutional incentives for and constraints on press coverage of global environmental problems in a comparative context, we hope to have suggested how a deeper understanding of the role of national press organizations in developing national responses to such problems might emerge.

Table 1: Background information on countries for which case studies were performed

Country	Population (millions) mid-1990	Area (thousand of square kilometers)	GNP per capita Dollars 1990
Canada	26.5	9,976	20,470
Germany	79.5	357	22,320
Hungary	10.6	93	2,780
Japan	123.5	378	25,430
Netherlands	14.9	37	17,320
USA	250.0	9,373	21,790

Source: The World Bank. 1992. World Development Report 1992. Oxford; NY: Oxford University Press, p. 219.

Table 2: Names and institutional affiliations of individuals responsible for the individual country case studies

Project Director:
William Clark, Harvard University, USA

Canada:
Don Munton, University of Northern British Columbia, Canada
Michael Keating, University of Western Ontario, Canada
Adam Fenech, Canada Centre for Inland Waters, Canada

Germany:
Renate Ell, University of Bayreuth, Germany

Hungary:
Ferenc Toth, Potsdam Institute for Research on the Consequences of Climate, Germany and Budapest University of Economic Sciences, Hungary
Éva Hizsnyik, Budapest Institute for Environmental Studies, Hungary

Japan:
Miranda Schreurs, University of Maryland, USA
Patricia Welch, University of Michigan, USA
Akiko Kôda, Keio University, Japan

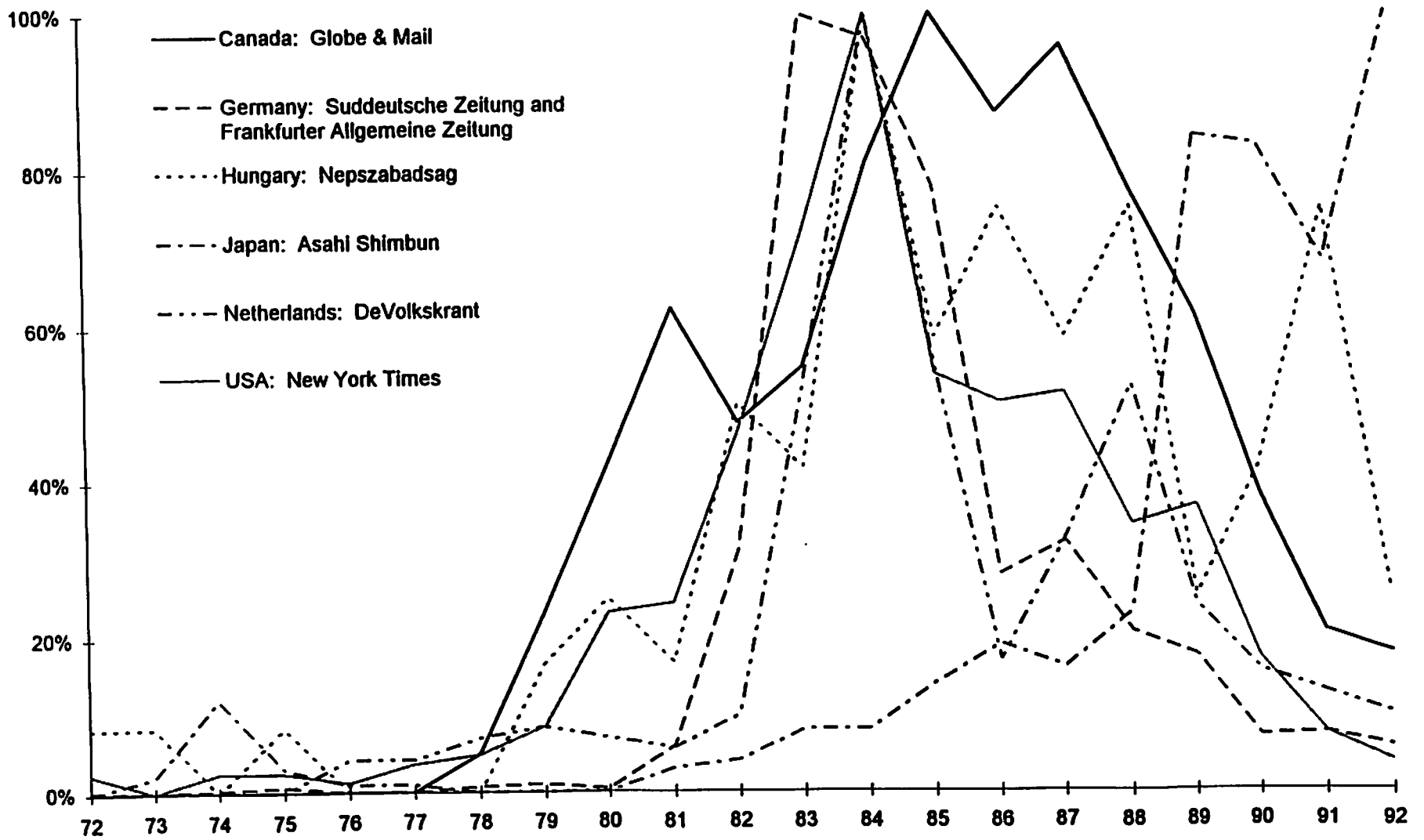
Netherlands:
Jan Gutteling, University of Twente, Netherlands
Mirjam Galetzka, University of Twente, Netherlands
Oene Wiegman, University of Twente, Netherlands

United States:
William Clark, Harvard University, USA
Nancy Dickson, Harvard University, USA
Roderick Scheer, Greenworking, USA
Renate Ell, University of Bayreuth, Germany
Amy Blitz, Massachusetts Institute of Technology, USA

Table 3: Elite Newspapers Studied

Country	Paper Studied	Circulation	Articles Identified	Articles Coded
Canada	Globe and Mail	318,000	3,406	293
Germany	Suddeutsche Zeitung	405,400	671	105
Frankfurter	Allgemeine Zeitung	392,000	572	105
Hungary	Nepszabadsag	316,000	85	85
Japan	Asahi Shinbun	8,200,000	292	292
Netherlands	De Volkskrant	358,200	299	299
USA	New York Times	1,115,000	447	298

COUNTRY COMPARISON OF NEWSPAPER ATTENTION TO ACID RAIN



Endnotes

1. William Clark is the Sidney Harman Professor of International Science, Policy and Human Development and Nancy Dickson is a Research Associate. Both are at the Center for Science and International Affairs at Harvard University's John F. Kennedy School of Government. Correspondence should be sent to the authors at the School, 79 Kennedy Street, Cambridge MA 02138 USA (email: clark@ksgrsch.harvard.edu, dickson@ksgrsch.harvard.edu).

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3. Comparative averaging of statements about risk in this study indicated that industry and government sources were more likely to deny than assert risks; citizens and experts were intermediate in asserting and denying risks; and advocacy groups were more likely to assert than to deny risks. Industry and experts were more likely to express certainty about their assessments; citizens and government were intermediate on certainty; and advocacy groups were more likely to express uncertainty (Sandman et al. 1987:22-3).

4. The project, Social Learning in the Management of Global Environmental Risks, is a comparative study looking at the evolution of societies' responses to emerging global environmental risks over the 35 year period from the International Geophysical Year to the United Nations Conference on Environment and Development. The study examines nine countries, the European Community, and key international institutions. Our goal has been better to understand the long term interactions among governments, the scientific community, nongovernmental organizations, the private sector, and the media in shaping the response of eleven countries or country groupings to the emerging threats of acid rain, stratospheric ozone depletion, and climate change. The project's findings and conclusions will be published in 1997 as a book, tentatively titled *Learning to Manage Global Environmental Risks*.

5. In contrast to the severe damage to coniferous forests in Germany, in Hungary hardwood forests were noticeably affected, with sessile oak populations being the most distressed.

6. A widely endorsed option in Japan was technology transfer, particularly flue gas desulfurization and denitrification technologies. Initially, reporting focused largely on European requests for Japanese flue gas desulfurization technology. Contracts for the sale of this technology were signed with several West European countries after the Chernobyl nuclear accident prompted several of these countries to abandon plans for new nuclear power plants and to look to coal for generating electricity.

7. Hungary fits this pattern to the extent that there was a general governmental predilection to support international efforts such as that underway to regulate acid rain.

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