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International Policy Instrument Prominence in the Climate Change Debate: A Case Study of the United States

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Abstract

This paper explores the factors influencing the types of policy instruments seriously considered and actively promoted by US policymakers over time in the climate change debate. A variant on Kingdon's model is used to describe how these factors and actor groups affect the pool of instrument considered—not only influencing which instruments go into the pool but also which ones bubble to the top and which ones sink to the bottom in prominence. In the model presented in this paper the following three process streams coupled with influence of time and historical experience determine the prominence of individual policy instruments in the pool: (1) a "politics/economics" stream which contains contextual factors (such as national mood and macroeconomic conditions) that constrain the type of policy instruments policymakers can consider; (2) a "policy options" stream which generates and promotes particular policy instruments; and (3) an "issues" stream which contains the policy goals faced by policymakers at the time. Actor groups can affect any of these streams and can act as "policy entrepreneurs" by advocating the use or disuse of certain instruments.

With regard to formal (i.e., report-like) assessments, this paper finds that although formal assessments have seemingly had little direct impact on US policy responses in the past, it is not the case that they have had no *indirect* impact or will not have a larger direct impact in the future. This lack of direct impact could be explained by (a) the primary use of alternative channels of information (e.g., advisors, briefings, memos) by policymakers; (b) the lack of attention given in assessments to the contextual factors constraining policy instrument choice; (c) the discrepancies between the goals assumed by assessors (e.g., a specific environmental goal) and the actual goals faced by policymakers; and (d) the assessment's intended audience.

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The Global Environmental Assessment (GEA) project is a collaborative team study of global environmental assessment as a link between science and policy. The Team is based at Harvard University, but includes substantial contributions from the International Institute for Applied Systems Analysis (IIASA) in Austria, Cornell University, Duke University and the Center for Integrated Study of the Human Dimensions of Global Change at Carnegie Mellon University. The project has two principal objectives. The first is to develop a more realistic and synoptic model of the actual relationships among science, assessment, and management in social responses to global change, and to use that model to understand, critique, and improve current practice of assessment as a bridge between science and policy making. The second is to elucidate a strategy of adaptive assessment and policy for global environmental problems, along with the methods and institutions to implement such a strategy in the real world.

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Publication abstracts of the GEA Project can be found on the GEA Web Page at http://www.ksg.harvard.edu/bcsia/enrp/gea. Further information on the Global Environmental Assessment project can be obtained from the Project Associate Director**,** Nancy Dickson, Belfer Center for Science and International Affairs, Kennedy School of Government, Harvard University, 79 JFK Street, Cambridge, MA 02138, telephone (617) 496-9469, telefax (617) 495-8963, Email nancy_dickson@harvard.edu.

Acronym List

CCAP	Climate Change Action Plan
CIAP	Climatic Impact Assessment Program
COP	Conference of the Parties
DOE	Department of Energy
EPA	Environmental Protection Agency
ERDA	Energy Research and Development Administration
FCCC	Framework Convention on Climate Change
GEF	Global Environmental Facility
INC	Intergovernmental Negotiating Committee
IPCC	Intergovernmental Panel on Climate Change
NCPO	National Climate Program Office
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council
SCEP	Study of Critical Environmental Programs
SMIC	Study of Man's Impact on Climate
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
USGCRP	United States Global Change Research Program
USIJI	United States Initiative on Joint Implementation
WMO	World Meterological Organization
WRI	World Resources Institute

International Policy Instrument Prominence in the Climate Change Debate: A Case Study of the United States

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Introduction[i]

The climate change issue has evolved substantially since the 1970's. Throughout the 1970's and the early 1980's, emphasis was placed on determining whether human activities had any discernible influence on the global climate. Following the discovery of the ozone hole in 1985 and the hot summer of 1988, attention shifted toward obtaining international cooperation to address the issue culminating with the signing of the Framework Convention on Climate Change (FCCC) in Rio in 1992. After the signing of the FCCC the emphasis shifted again, this time towards obtaining international agreement on an environmental goal—specifically, what the emissions target should be, within what timeframe, and how best to achieve the target.

Although policy instruments have been the focus of recent discussions, it is not the case that their use has only recently been considered. In fact, as elaborated further in this paper, policy instruments have played a role in the evolution of the climate issue over time. The goal of this paper is to gain a better understanding of (1) the various factors influencing policy instrument prominence; (2) how instruments are used to reach specific policy goals; and (3) the channels through which informational factors such as formal assessments play a part in the policy instrument decision process. This paper focuses on policy instrument *prominence* rather than *choice* (i.e., implementation) in order to draw out the factors that influence which instruments US policymakers seriously consider and actively promote—instruments that may or may not be actually implemented. Since little policy instrument implementation has occurred in the climate issue to date, focusing on prominence rather than choice seems appropriate for reasons including the availability of empirical evidence.

To gain a deeper understanding of these issues, this paper focuses specifically on *international* policy instruments for climate change and those considered by the United States.[ii] Policy instruments are defined as mechanisms that induce desired changes in behavior and/or the development and diffusion of particular technologies. Policy instruments fall into one of four broad categories: (1) technological instruments (e.g., energy R&D research funding); (2) market instruments (e.g., taxes, tradable permits, joint implementation); (3) regulatory instruments (e.g., uniform technology or performance standards); and (4) institutional instruments (e.g., centralized investment funds like the Global Environment Facility).

Four central themes emerge from this research and are discussed further in this paper:

1. A variant on the model introduced by John Kingdon is used in this paper to describe how particular factors influence policy instrument prominence in the climate change debate. As shown in Figure 1, three process streams (i.e., a "politics/economics" stream, a "policy options" stream, and an "issues" stream) and the influence of time and historical experience impact the pool of policy instruments by affecting the types of instruments flowing into the pool and which instruments rise and fall in prominence. The various actor groups can affect any of these streams and can act as "policy entrepreneurs" by advocating the use or disuse of certain instruments.
2. Informational mechanisms such as formal assessments can affect the prominence of policy instruments in the following ways: (a) by providing information directly or indirectly to the policymakers, the public, and the policy community which causes a shift in their perceptions, knowledge, and/or interests; (b) by influencing contextual factors that constrain the feasible set of instruments; and/or (c) by providing information that causes a shift in policy goals.
3. Although formal assessments have seemingly had little direct impact on US policy responses in the past, it is not the case that they have had no *indirect* impact or will not have a larger direct impact in the future. This lack of direct impact could be explained by (a) the primary use of alternative channels of information (e.g., advisors, briefings, memos) by policymakers; (b) the lack of attention given in assessments to the contextual factors constraining policy instrument choice; (c) the discrepancies between the goals assumed by assessors (e.g., a specific environmental goal) and the actual goals faced by policymakers; and (d) the assessment's intended audience.
4. Reflecting on the model presented in Figure 1, an assessment should be considered "successful" from the standpoint of policy instrument prominence if it (a) is instrumental in advancing the issue to the next stage in the issue cycle by affecting the current policy goals; (b) contributes to the loosening of constraints that define the set of "feasible" policy instruments allowing policymakers to make a better policy instrument choice; and/or (c) provides policy-relevant information to policymakers which allows them to make a more educated policy instrument choice.

The paper is organized as follows. Section II presents a brief history of US policy responses since the 1970's. Section III presents a model of policy instrument prominence and applies it to the case of climate change policy responses in the U.S. Section IV

compares the three steams in the case of the US, discusses the role of assessments, and raises the question of what constitutes a 'successful' assessment from the standpoint of policy instrument prominence. Section V concludes.

A Brief History of US Policy Responses in the Climate Change Debate

The Carter Years (1976-1980)[iii]

The years of the Carter presidency were a period of heightened interest concerning human influences on climate. Increased climate research funding to study the impacts of human activities on climate and increased coordination of climate research efforts among the various federal agencies were the chosen climate policy responses during this time period.

In the early 1970's, federal R&D programs such as the supersonic transport program began to raise questions concerning the effect of these alternative modes of transport on climate. These concerns resulted in the development of the Climatic Impact Assessment Program (CIAP) initiated by the Department of Transportation. Concurrently, increased international attention was being given to the climate issue. As a result of this international attention and research coming out of the SCEP (Study of Critical Environmental Problems) and the SMIC (Study of Man's Impact on Climate), an international agreement at the 1972 United Nations Stockholm Conference on the Human Environment to increase international CO2 monitoring was signed.

Efforts were also made during this time to improve coordination among the various national climate research programs being created. This prompted the adoption of the National Climate Program Act in 1978 which increased the level of climate research funding and established the National Climate Program Office under the auspices of the National Oceanic and Atmospheric Administration (NOAA). The National Climate Program Office (NCPO) was charged with organizing all federally-funded climate research.

Coincident with the establishment of the National Climate Program Office was the second energy crisis of the 1970's. In response, the Carter Administration began to explore options to reduce the U.S.'s dependency on foreign oil through the development of coal-based synthetic fuels. As part of this effort, Carter increased the budget of the Energy Research and Development Administration (ERDA)—later becoming the Department of Energy—by one million dollars to examine the effects of increased CO2 from the expanded use of coal. This research was seriously curtailed at the end of the 1970's with the fall in interest in synthetic fuels as a result of declining oil prices.

The Reagan Years (1980-1988)[iv]

Many of the energy R&D funding decisions made by the Carter administration were later considered poor and excessive by many in the US public. This fed an already existing national trend toward more conservative views—including the desire for less government and industry deregulation where preferred actions of private businesses are induced through market mechanisms. The Reagan administration shared these views and as a consequence slashed energy R&D funding by more than half.[v] The Reagan administration was also keen to preserve the status quo. As a result, the Department of Energy (formally the ERDA) in the early 1980's attempted to reduce its climate research budget and funnel more of its budget to activities that would not threaten a "business-as-usual" strategy.

Congress during these years did not agree with the Reagan administration's climate research strategy resulting in numerous battles with the administration over DOE's attempt to reduce its climate research budget and the content of its various climate research programs. Although many members of Congress were more supportive of specific actions to combat climate change, key members realized that the degree of scientific certainty needed to move the issue further and to sustain a long-term climate strategy did not yet exist. This is evident in a remark made by Representative Albert Gore in a 1982 congressional hearing on the issue in which he disputes a call for remedial action: "....it does seem to me that if we can elevate the degree of certainty, we will have a better chance of summoning up the political will to address this problem."[vi]

Following the discovery of the ozone hole in 1985, a scientific consensus statement[vii] provided in the 1985 Villach report, and the hot summer of 1988, public concern over the issue rose dramatically. The US's policy response, however, came in the form of more attention given to the issue. Noteworthy was the 1987 Global Climate Protection Act which mandated the development of a coordinated national policy on climate change and the National Science Foundation Fiscal Year 1987 authorization which specified the preparation of a report on the U.S.'s plans for international cooperation to combat climate change. In addition, the climate change issue was becoming more prominent in the federal government as reflected in an increase in the number of agencies, and House and Senate committees and subcommittees, and the establishment in 1989 (initially under a Presidential Initiative and later as part of the 1990 Global Change Research Act) of the US Global Change Research Program (USGCRP).

The Bush Years (1988-1992)

Reluctance to take further steps towards specific policies to reduce the threat of climate change continued throughout the four years of the Bush administration. The difference from previous years was that although policymakers were reluctant to make any firm policy statements, scientists were not. A consensus statement made by the Villach group of scientists and a call for a 20% reduction in emissions made by participants of the 1988 Toronto Conference likely raised concerns among U.S. policymakers that they would be forced to make policy recommendations before it was politically feasible and before key scientific uncertainties were resolved.[viii] Such concerns (and the desire to gain control

over scientific statements) likely lead to the decision by the United Nations General Assembly to create the Intergovernmental Panel on Climate Change in 1988 under the auspices of the World Meterological Organization (WMO) and the United Nations Environment Programme (UNEP).[ix]

Concurrently, other countries were becoming increasingly engaged in the issue, ultimately leading to the 1990 Second World Climate Conference and the 1992 UN Conference on Environment and Development (UNCED). In addition to a United Nations resolution in 1989 setting up the 1992 UNCED meeting, two meetings attended by environment ministers of countries within Europe and North America were convened in which global climate change was discussed: a 1989 meeting in Noordwijk, the Netherlands, and a 1990 meeting in Bergen, Norway.[x] Throughout these meetings the U.S. was reluctant to commit to specific policy actions although Western European ministers were pressing for CO2 targets based on the "Precautionary Principle" (i.e., even if the science is uncertain, action should still be taken as a precaution to irreversible environmental damage).[xi]

This difference in opinion between the United States and Western Europe continued at the 1990 Second World Climate Conference held in Geneva, Switzerland. Here members of the European Free Trade Association (EFTA), Canada, Australia, New Zealand, and Japan each committed to stabilize CO2 emissions at 1990 levels by the year 2000—only the United States did not agree to a binding target.[xii] The ensuing negotiations resulted in a weak ministerial declaration which stated that industrialized countries should either establish targets and/or national programs to control emissions—a requirement that all countries currently met.

Additionally, the declaration called for the transfer of financial and technological resources from developed to developing countries to enable developing countries to meet the incremental costs associated with measures to combat climate change. Perhaps in response to the need for a mechanism to assist in these transfers, the Global Environment Facility (GEF) was established originally as a pilot program in October 1991 (and later restructured and replenished in 1994) to facilitate the disbursement of funds not only for projects that address global warming but also projects that address biodiversity conservation, pollution of international waters, and ozone depletion.

Much of the discussion in the Noordwijk and Bergen meetings was in preparation for the 1992 United Nations Conference on Environment and Development to be held in Rio de Janeiro, Brazil. From these initial meetings, however, it was clear that a formal negotiation body was needed. As a result, the Intergovernmental Negotiating Committee (INC) was established in a 1990 UN General Assembly resolution to provide a forum for protocol negotiations in preparation for the UNCED meetings.[xiii] Five INC meetings were held prior to the UNCED in 1992.

The international discussions prior to the INC meetings focused on the reduction of CO2 from the energy sector and unilateral action by participating countries—suggestions which had serious implications for the United States. In an effort to explore other options, the Bush administration requested the Department of Justice to propose recommendations on the type of climate policy it should advocate.[xiv] What resulted was a memo written by

Richard Stewart and Jonathan Wiener, both of the Justice Department, suggesting a "comprehensive" approach to policymaking (i.e., the consideration of all greenhouse gases and all sources and sinks when deciding policy) and the establishment of a tradable permits market to achieve lower-cost emissions reductions.[xv] The "comprehensive" approach was presented by the U.S. at the first INC meeting in February 1991 in a report titled, "A Comprehensive Approach to Addressing Potential Climate Change." The idea of emissions trading was also raised in this report but not firmly advocated by the U.S.[xvi]

Although the "comprehensive" approach advocates the need to consider all aspects of the climate system when deciding policy, it does not recommend specific policy actions. This reflects the reluctance of the Bush administration to agree to any committed action. Instead the administration chose to embrace a "no-regrets" strategy—an approach that advocates taking only those actions which were justified for other reasons.[xvii] This idea was presented in January 1990 by Secretary of State James Baker to the IPCC's Working Group III on response strategies.[xviii] The bottom-up approach of the "no-regrets" strategy was in conflict with the top-down approach advocated by those countries in favor of targets and timetables.[xix]

Throughout the remaining three INC meetings prior to UNCED, the United States, citing its economic dependency on fossil fuels, remained firm with its refusal to agree to targets and timetables without solid scientific evidence. The U.S. continued to push for a comprehensive approach to the problem and for flexibility in the final text to be presented at UNCED. Realizing the importance of developing country participation in any climate change solution and the reluctance of developing countries to participate without financial and technological assistance, the U.S. reluctantly agreed to provide $75 million to assist developing countries in their efforts to lower emissions--$50 million going to the GEF and $25 million to country studies.[xx]

The final text of the Framework Convention on Climate Change (FCCC), signed at the 1992 UNCED meeting, reflected much of the flexibility and comprehensiveness sought by the United States. Particular statements include:

> *Article 3, Paragraph 3*: "The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects....taking into account that policies and measure to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost."
>
> *Article 4, Paragraph 2a*: "...developed country Parties and other Parties included in Annex 1 may implement such policies and measures jointly with other Parties and may assist other Parties in contributing to the achievement of the objective of the Convention..."

Most importantly, the FCCC required each country to submit a report outlining its plan for reducing emissions to 1990 levels by the year 2000—a report that was submitted not by the Bush administration but by the new Clinton administration.

The Clinton Years (1992 to present)

The current Clinton administration, although also concerned about the political and economic costs associated with climate policy action, does not seem as determined to slow the process as the previous two administrations. Rather than highlighting scientific uncertainty like the previous two administrations, the Clinton administration is focusing on the emerging scientific consensus.

The current administration seems most concerned about achieving the political will necessary to commit to policy action. The Clinton administration began its tenure by testing this political will. A small BTU tax included as part of the administration's proposed budget was immediately shot down suggesting that the public and congress, although increasingly concerned about climate change, were not at this point willing to pay to address it.

Acute awareness of the public's animosity towards taxes is reflected in much of the administration's climate change policy responses. As required by the FCCC, the US submitted its plan in 1993—the Climate Change Action Plan (CCAP)—for stabilizing emissions at 1990 levels by the year 2000. Reflecting the US's anti-regulatory climate, the CCAP consisted mainly of extensions to existing programs and voluntary measures undertaken by US businesses.

The US has been also very active in pursuing "flexible" approaches to emissions reductions. The US played a dominant role in pushing for inclusion of the language found in Article 4, Paragraph 2a of the FCCC which allows for joint efforts across parties to reach the goals of the Convention. The concept of 'joint implementation' (JI) was promoted by the US as a cost-effective approach to achieve the goals of the FCCC by allowing countries to partially offset their emissions reductions commitments by financing reductions in other countries. In theory, joint implementation could facilitate the transfer of financial and technological resources from developed countries to developing countries as required by the Convention. A decision on JI was to be made at the first Conference of the Parties (COP-1) in March 1995.[xxi]

Prior to COP-1, the US was busy implementing and promoting its own national JI program (i.e., the United States Initiative on Joint Implementation (USIJI) established in 1993) and setting up bilateral and multilateral agreements with other countries. Through these efforts, the US hoped to influence the decision regarding JI at COP-1 by garnering support from other countries and by demonstrating the feasibility of such a program. Although no international JI program with credit was adopted at COP-1, the Berlin decision allowed for a pilot-phase program, referred to as "activities implemented jointly" (AIJ), where "no credits shall accrue to any Party as a result of greenhouse gas emissions reduced or sequestered during the pilot phase from activities implemented jointly" (Berlin Decision, COP1).

The second COP was held in Geneva, Switzerland in July 1996. At COP-2 it was acknowledged that the non-binding efforts outlined in individual country plans would not achieve the goal of stabilizing emissions at 1990 levels by the year 2000. Coming on the heels of the IPCC Second Assessment Report released in December 1995 which found

that “the balance of evidence suggests a discernible human influence on global climate” (IPCC [1995]), it was clear that steps towards a binding agreement were needed. As a result, each country or group of countries was given the opportunity to submit a proposed draft protocol to be considered for inclusion in a final protocol to be negotiated at COP-3 in Kyoto, Japan in December 1997. These proposed protocols are to be consolidated and streamlined if possible in a series of meetings of the Ad Hoc Group on the Berlin Mandate (AGBM).

Realizing that political acceptance and sustainability of any committed action requires public and interest group approval, the Clinton administration has recently taken deliberate steps to gain public and interest group acceptance . For one, the proposed draft protocol submitted by the US stresses flexibility and comprehensiveness: (1) multi-year emissions budgets with banking and borrowing between periods; (2) an international emissions trading program among Annex 1 countries (and/or countries with binding targets); and (3) joint implementation between countries with binding targets and countries without. Conspicuously absent from the US proposal is any mention of emissions targets and timetables—an omission that has led many countries to question the US’s seriousness in addressing the problem.

The current administration has also recently made deliberate steps domestically to garner public support for a future binding commitment. For one, Vice President Gore has established a series of public workshops on the subject to be held across the country which will highlight the possible catastrophic consequences of climate change. In addition, the administration has instituted the “Interagency Analysis Team” (coordinated by the Department of Commerce) which is charged with providing modeling results and economic analyses on the impacts of specific policies. This information will be provided to policymakers in the form of briefing documents and will be presented at public conferences.

A Model of Policy Instrument Prominence

Choosing the set of appropriate policy instruments to reach particular policy goals is not a mere exercise in determining which instruments in an economic sense are most efficient or cost-effective. It involves choosing from a set of instruments constrained by various contextual factors (e.g., political and economic climate) given the current policy goals and the knowledge, perceptions, and interests of the different actor groups.

The case of policy instrument prominence in the United States can be usefully described using a variant on the model of public policy-making introduced by John Kingdon (Kingdon [1995]). In Kingdon’s model three process streams (i.e., problem recognition, formation of policy proposals, and politics) develop and operate largely independently of each other coming together in a “policy window” (i.e., a window of time when conditions allow for the joining of problem with solution). I modify this model slightly to fit the case of study in this paper. In particular, I emphasize the importance of historical experience by drawing out the time dimensionality of the model--a feature implicit in Kingdon’s model.

The Policy Instrument "Primeval Soup"

At any point in time a pool of possible policy instruments exists to address a particular policy problem. Policy instruments "float around" in the pool with some bubbling to the top and others sinking to the bottom. Kingdon uses the analogy of the "primeval soup" of biological natural selection (i.e., molecules float around with some surviving and others not) to describe the process of public policy selection. The key concept to take away from this analogy is that it is rarely the case that new policy instruments are added to the pool. Rather, policy instruments that rise in prominence are typically policy instruments that have been floating around for years or have been modified, combined, or repackaged to fit the current situation.

Factors influencing not only which instruments are found in the pool but more importantly which ones float to the top and which ones sink to the bottom are captured in three process streams (similar to Kingdon's model) shown in Figure 1: a "politics/economics" stream; a "policy options" stream; and an "issues" stream. The "politics/economics" stream comprises factors such as public mood (e.g., conservative vs. liberal), views in the current administration and congress, and macroeconomic conditions—each of which affect the prominence of particular policy instruments. The "policy options" stream contains the actual proposals or policy alternatives generated by a policy community composed of academics, researchers, bureaucrats, interest groups, etc. Lastly, the "policy issues" stream is comprised of particular policy issues or policy goals for which a solution is sought. These issues or goals have an obvious influence on the type of instruments that rise to the top in prominence. Although not entirely independent of one another, these process streams operate largely independently. At times certain policy issues are given higher priority because a solution is known to exist. However, in most cases issues gain prominence on the public policy agenda independently of the policy options stream.

Changes in any of these three streams can cause a "stirring of the pot" with certain instruments floating to the top, others sinking to the bottom, and some staying at the same level of prominence. Changes in these three streams, however, are not the only stimuli to cause a stirring of the pot--time is also important. Changes in the streams can cause a sudden stirring of the pot, but between these stirrings there is still a slow movement of ideas in the pot--e.g., the public becomes more comfortable with an idea the longer it is discussed, or positive historical experience with a particular instrument in another setting may increase public acceptance of such an instrument in the current policy setting.

Figure 1 attempts to capture the multiple dimensions of policy instrument prominence in graphical form. The pool of possible policy instruments moves through time with additions from the "policy options" stream. Some instruments float to the top of the pool in prominence affected by the three streams described above and time. These three streams and the importance of history are elaborated below. This model differs from the actor models found in the political science literature which focus on the interactions between the various actor groups to describe public policy-making. Instead this model focuses on processes which are influenced by the various actor groups.

The "Politics/Economics" Stream

The "politics/economics" stream is composed of political and economic factors which are largely independent of the specific policy issue at hand yet affect the prominence of policy instruments in the pool. These factors include: (1) the political and economic climate; (2) public knowledge and perceptions; and (3) the knowledge, perceptions, and ideology of policymakers within the administration and congress.

Political and Economic Climate

What stands out from tracing US policy responses since the 1970's is the dominant role political and economic factors have played in policy instrument prominence. Segmenting history into administrations is useful since changes in the administration are correlated with shifts in the types of policy instruments considered and promoted. Republican administrations have occupied the White House in twelve of the last 16 years and is reflective of the general trend toward more conservative views in the US—including the desire for less government and a movement towards more market-based approaches to governmental regulation. As Hahn and Stavins argue, this shift towards more conservative views has led to increased acceptance of market-based environmental policy instruments.[xxii]

Some market-based instruments (e.g., environmental taxes), however, are not widely accepted by the US public. As part of a general trend towards more conservative views, most US taxpayers are against the creation or expansion of federal programs funded by tax dollars; rather, they support a less centralized government and deregulation of industry where desired actions of private businesses are induced through market mechanisms. This sentiment and the public's concern over a ballooning national debt help explain the U.S.'s reluctance to fund a centralized investment fund like the GEF and the U.S.'s current endorsement of market-based mechanisms like international emissions trading or joint implementation. The anti-tax mood resulting from this general trend was made clear in the rejection of Clinton's proposed BTU tax in 1993 and pushes policy instruments based on taxes (which from an economic sense may be more efficient) down to the bottom of the pool of policy instruments.

The US public's lack of trust in the government to spend tax dollars wisely and public concern over large federal budget deficits could also explain the scarcity of support for increased energy R&D funding as an policy instrument to hedge against future abatement costs. This sentiment was fed by the series of poor (ex-post) energy R&D funding decisions made by the Carter administration contributing to a steep decline in federal energy R&D funding by the Reagan administration in the 1980's. Federally-funded energy R&D programs are unlikely to make a large comeback and, according to the policymakers I spoke with, the emphasis is now on developing programs that will induce private firms to engage in energy R&D. Although it can be argued that both privately-induced and federally-funded R&D are needed (federally-funded R&D for long-term R&D efforts in which private firms are reluctant to engage and privately-induced R&D

for the commercialization of newly developed technologies), significant increases in federally-funded R&D efforts seem unlikely in the near future.

Economic factors are also key determinants of policy instrument prominence. The US economy is highly fossil fuel-intensive, leading to the rejection of any policy which significantly restricts fossil fuel use. It is believed that significantly restricting fossil fuel use would be not only detrimental to the US domestic economy but would also have major implications for US competitiveness in the global economy—a primary concern of US policymakers.[xxiii] These factors help explain the US's policy stance over the years--the continued reluctance to agree to emissions targets and timetables; the push for a "comprehensive" approach (i.e., the consideration of all greenhouse gases (not just CO_2) and all sources and sinks (not just energy sources)); and the endorsement of policy instruments that allow the purchase of reductions elsewhere (e.g., tradable permits, joint implementation).

Public Knowledge and Perceptions

The public's understanding and perceptions of particular policy instruments also influence which instruments are most seriously considered. Full understanding of the issues surrounding policy instrument choice requires some level of expertise in the theory and application of these instruments—expertise that many citizens do not and care not to possess. As discussed in Hahn and Stavins [1991], unless directly affected by the regulation, citizens may choose to remain "rationally ignorant" of the issues surrounding policy instrument choice—instead basing their opinions on limited knowledge, perceptions, and ideology.

This "rational ignorance" of the US public regarding policy instruments creates a tendency towards instruments that possess certain characteristics. First, industry is many times considered the "bad guy" by the US public; therefore, an instrument which forces industry to pay (although in most cases consumers will end up paying indirectly) will be preferred by policymakers over an instrument that directly affects US consumers. Second, policymakers will tend to prefer an instrument that hides the true abatement costs from the US public[xxiv]—e.g., an environmental tax makes costs transparent while tradable permits and technology standards do not. Lastly, policymakers prefer instruments that are perceived to be cost-effective by the US public—i.e., instruments that obtain the environmental goal at least-cost. Market-based approaches have been shown in theory to be the least-cost approach to environmental protection and have been slowly gaining favor.

"Rational ignorance" also causes the US public to anchor on one policy instrument as the tool to solve all environmental problems. Most economists believe that the optimal choice of instrument is dependent on a set of criteria implying it is not the case that one instrument is best for all circumstances. This is evident in chapter 11 of the IPCC Second Assessment Report of Working Group III where a comprehensive review of all instruments is presented. However, the expertise required to understand the tradeoffs between instruments causes some to anchor on an instrument rather than on a set of criteria. For the variety of reasons discussed, the instrument du jour is tradable permits

although its feasibility and true potential for significantly lowering abatement costs in the US by purchasing reductions elsewhere may be a bit exaggerated.

The public's affection for tradable permits and its belief that such an instrument will significantly lower abatement costs have played a role in the US's recent push for an international tradable permits market. As discussed in Hahn and Stavins [1991], although the policy "goal" choice and the policy "instrument" choice should be separate, they are inextricably linked. The US public and interest groups will be more willing to accept stricter environmental goals if they believe the costs associated with attainment of these goals are reasonable. This point was emphasized by a number of individuals I spoke with leaving me with the impression that the impetus behind the current push by the US for a tradable permits program may be to gain public acceptance of a binding target and timetable.

Knowledge, Perceptions, and Ideology of Policymakers

The issues arising out of the limits to public knowledge discussed above also apply to policymakers. The reason for a policymaker's lack of understanding of the theory behind policy instrument choice, however, is likely not a conscious choice by the policymaker to be "rationally ignorant." Rather, many policymakers lack the time and appropriate training in fields such as economics to understand the nuances of policy instrument choice causing these policymakers to also anchor on an instrument rather than a set of evaluative criteria. As discussed in Hahn and Stavins [1991], political scientist Steven Kelman (Kelman [1981]) interviewed both Democrats and Republicans on the congressional staff and found that although the two groups held opposite views of market-based approaches to environmental regulation, neither group understood the theory and issues behind these instruments! Rather, their opinions seemed to be based on ideology.

Many instruments are appealing to policymakers for political reasons. In contrast with regulatory (i.e., command-and-control) instruments, market-based instruments tend to depoliticize the policy debate by allowing firms (rather than regulators) to decide how to best meet emissions targets.[xxv] This can also help explain many policymakers' affection for market-based instruments. Lastly, the importance of individual players in the policymaking process should not be underestimated. With each change in the administration, a new political structure including a new set of policymakers in key positions with different levels of knowledge, perceptions, and interests is introduced.

Congress also influences the prominence of policy instruments within the pool even though members of Congress are not directly involved in the international climate negotiations. The fact that Congress must ratify any international agreement is permanently in the back of the minds of US negotiators. It is also a probable factor influencing the US's reluctance to propose specific targets and timetables. In other countries, it is likely that the policymakers involved in the international negotiations are also involved in the ratification of any agreement. This grants these individuals some freedom to negotiate specific policy actions.[xxvi] Due to the separation of powers in the US, US negotiators are not granted this freedom.

The views of other countries also play into the US's decision of which policy instruments to promote in international negotiations since the US may be reluctant to propose an instrument that will be immediately shot down by other countries. The importance of considering other countries' views is evident from the recent Ad Hoc Group on the Berlin Mandate (AGBM) meetings held in March 1997 in Bonn, Germany. The US's proposal for multi-year emissions budgets and emissions trading, banking, and borrowing without any mention of emissions targets and timetables was largely received with negative reaction by representatives of other countries.

The consideration of other countries' interests was also important during the negotiations leading up to the Rio conference in 1992. Developing countries were reluctant to participate in any climate agreement without the guarantee of financial and technological assistance. To allay these concerns, the US volunteered to commit to a level of funding to the Global Environment Facility.[xxvii] Lastly, historical experience with particular instruments not only explains the type of instruments promoted by the US over time but also the type of instrument advocated by other countries. The fact that other countries have had less experience with emissions trading than the US could help explain the contrast in support for this instrument between the US and other countries.

The "Policy Options" Stream

Unlike the "politics/economics" stream which affects the pool of policy instruments through changes in factors largely external to the policy issue at hand (e.g., shifts in national mood, changes in macroeconomic conditions, and changes in the ideological composition of the administration and congress), the "policy options" stream affects the pool of policy instruments through conscious efforts by the policy community to add to the existing pool or to promote particular instruments. Similar to the "policy" stream in Kingdon's model, the "policy options" stream in Figure 1 affects the pool of policy instruments in two ways: (1) by adding instruments to the pool through the development of new instruments and the modification, combination, or repackaging of existing instruments; and (2) by changing the level of prominence of instruments already in the pool. Various actor groups within the policy community can affect the "policy options" stream by generating policy instruments to add to the pool and/or by advocating the use or disuse of particular instruments.

Although the policy community generating the policy instruments found in the pool of instruments comprises a number of different actor groups (e.g., academics, researchers, interest groups, bureaucrats, individual policymakers), the source of the majority of policy instruments found in the pool is typically academics and researchers--individuals which, to a large extent, make up the assessment community. As emphasized by Kingdon, this community of specialists acts largely independently of events occurring in the "politics/economics" stream such as changes in the administration or macroeconomic conditions. The advantages and disadvantages of the various types of instruments (technological, market, regulatory, and institutional) have been presented and debated throughout the academic literature and at conferences for years in the context of a number of different policy issues. Moreover, these instruments have been used in various policy

settings to address issues other than climate change allowing comparisons to be made and lessons to be learned.

As stressed by Kingdon, the *origins* of policy options, however, are less important than the process of modifying, combining, repackaging and/or promoting policy instruments--the process that influences which policy instruments rise to the top of the pool in prominence and are discussed seriously in policy circles. As elaborated below, the types of instruments added to the pool and promoted within the pool are reflective of (1) the nature of the policy issue; (2) the interests, perceptions, and ideology of the various actor groups within the policy community; and (3) the channels through which information flows from the policy community to policymakers.

Nature of the Policy Issue

The climate change issue has certain characteristics that drive the type of policy instruments seriously considered. First, key scientific uncertainties still exist causing US policymakers to argue for an instrument that is both flexible and adaptable allowing for changes as uncertainties are resolved. Second, the issue is intertemporal and global in nature. Cumulative (not daily or yearly) and global (not region-specific) emissions are what matters for climate. Numerous studies (e.g., IPCC [1995], Manne [1993], Martins et al [1993], Edmonds et al [1995], and Rose and Stevens [1994]) estimate large cost savings if nations cooperated to reduce global emissions (through mechanisms such as emissions trading or joint implementation) rather than if nations reduced emissions unilaterally. Wigley, Richels and Edmonds [1996] argue that abatement costs could be cut in half if emissions were allowed to rise in the near term and then reduced sharply rather than if emissions were reduced immediately. Therefore, a policy instrument that will result not only in the equalization of marginal abatement costs across regions but also the equalization of marginal abatement costs across time periods is desirable from a cost-effective standpoint. The US's current push for multi-year budgets and banking and borrowing reflects this desire. Third, the issue is tightly connected with other issues such as development, energy, and other environmental problems. These other issues are likely to define which types of policy responses are able to be implemented and thus which policy instruments could be considered.

Lastly, although some zero or negative cost mitigation options may exist to provide a small share of the emissions reductions needed, the sum of efforts to adequately address the climate change issue is expected to be costly. Unlike the ozone issue where a low cost alternative existed which can explain the willingness of countries to commit to action, no such low-cost alternative currently exists to address the entire climate change problem. This fact constrains the type of policy instruments that can be utilized. Since the marginal cost curve of abatement options for addressing climate change is believed to become steeper as the level of abatement rises, it has been shown that as we approach the steeper part of the curve policy instruments such as command-and-control are unlikely to work.[xxviii] Instead more innovative solutions which allow firms to choose their method of abatement and to avoid the steeper part of the marginal cost curve by purchasing reductions from other sources are needed. The current proposal for an Annex 1-only

tradable permits program is unlikely to result in the ability of US firms to purchase a large share of their required reductions from other countries—instead such a program may allow these firms to avoid the steeper part of their MC curves.

"Policy Entrepreneurs"

Specific actors within the policy community can play a significant role in determining which instruments percolate to the top of the pool of policy instruments. These actor groups include firms, environmental advocacy groups, bureaucrats, academics and researchers, and individual policymakers. Kingdon refers to these policy advocates as "policy entrepreneurs"--i.e., individuals or groups of individuals advocating the use or disuse of particular policy instruments based on their interests, perceptions and ideology. Activities of these "policy entrepreneurs" not only include advocacy of particular instruments, but also efforts to "soften up" the public and policy community to certain policy approaches through education and promotional activities. For instance, deliberate attempts have been made in the past to educate industry and environmental advocacy groups on the merits of market-based approaches to environmental regulation. These attempts have caused a significant increase in acceptance of these types of instruments. As explained by Kingdon, policy proposals which deviate significantly from the status quo will fall flat if no efforts were previously made to get the public and policy community comfortable with certain policy approaches.

Firms

Keohane, Revesz, and Stavins [1997] have explored in a domestic context why, from an economic standpoint, firms advocate the use of certain policy instruments. Some of the explanations given by the authors apply in an international context as well. In particular, the authors attribute a firm's promotion of particular policy instruments to three factors:

1. *whether the instrument lowers the total industry's cost of compliance*: market-based instruments hold the highest potential for achieving the lowest cost of compliance for the total industry and from this standpoint should be desirable to firms.[xxix]
2. *whether the instrument offers rents and entry barriers*: A tradable permits program based on a grandfathered allocation scheme (i.e., permits allocated based on past emissions) is likely to result in rents to the grandfathered firms and to erect entry barriers to newer (perhaps less polluting) facilities. Therefore, grandfathered firms that stand to gain from such an allocation scheme are likely to advocate such a policy instrument.
3. *whether the instrument provides differential costs of compliance across industries*: A policy instrument that results in differential costs across firms thus creating winners and losers will also affect an industry's support for that instrument.

A firm's promotion of particular policy instruments is also based on political factors. The current anti-regulatory climate in the US provides firms the strength to successfully argue for voluntary efforts rather than mandatory regulations.[xxx] This is evident from the

pervasive use of voluntary measures in the Climate Change Action Plan submitted by the US government in response to the FCCC. In addition to voluntary measures, firms have come to embrace the idea of market-based instruments due to the ability of these instruments to decriminalize polluting activities. By allowing firms the choice of "paying to pollute" rather than imposing fines, market-based instruments create the perception that the polluting activity is acceptable.[xxxi]

Environmental Advocacy Groups

As discussed in Keohane, Revesz and Stavins [1997], an environmental advocacy group's choice of which policy instrument to support is not only a reflection of the group's environmental goals, but also a reflection of the group's desire for increased membership and donor contributions. Supporting an instrument which is chosen by policymakers and identifiable with the environmental advocacy group is apt to increase the group's visibility and lead to increased membership and contributions. This is likely the story behind the Environmental Defense Fund's strong support for market-based approaches while other environmental advocacy groups have in the past rejected such instruments.[xxxii] It is also the case that in the past the majority of individuals who staff environmental advocacy groups is trained in the legal field—not economics. This creates a tendency for these groups to support regulatory rather than market-based approaches.[xxxiii]

In my recent discussions with individuals involved in the formulation of the US's policy stance in the international climate change negotiations, many of the environmental advocacy groups seem to now support market-based approaches to address the climate change problem. This could largely be the result of these groups' realization that to secure public acceptance of a binding commitment, instruments which provide the perception that costs will be minimized must be proposed. For these groups, the end is in many cases more important than the means and some agreement for policy action is better than nothing.

Deliberate attempts have been made by environmental advocacy groups to promote particular policy responses and to educate the public. In 1987, for instance, Irving Mintzer of the World Resources Institute (WRI) published an assessment report which compared various policy scenarios (Mintzer [1987]). Although not explicit on the exact policy instruments to implement, government subsidies to promote energy efficiency and renewables usage and taxes on energy seem to be implied. Although successful from the standpoint of increased visibility for Mintzer and WRI, the assessment did little to spur policy action or increase the prominence of these policy instruments.

A 1990 Greenpeace report edited by Jeremy Leggett of Greenpeace (Leggett [1990]) was also an attempt to spur policy action. This report concludes with an endorsement of the "precautionary principle" (i.e., even if the science is uncertain, action should be taken as a precaution to irreversible environmental damage)--a policy view supported at the time by many of the European countries, but not by the U.S.

Bureaucrats

Similar to environmental advocacy groups, individuals within the bureaucracy have in the past been largely trained in the legal field. Since understanding market-based instruments requires some form of economics training, the composition of the bureaucracy in the past could explain the slow penetration of market-based instruments in US environmental policy.[xxxiv] A comparison of a 1983 EPA assessment report titled, "Can We Delay a Greenhouse Warming" (Seidel [1983]) with the 1990 EPA assessment report titled, "Policy Options for Stabilizing Global Climate" (Lashof and Tirpak [1990]) shows a visible shift in the types of instruments promoted by the USEPA. The 1983 EPA report advocates the use of regulatory instruments such as fuel bans and CO_2 scrubbing in addition to taxes on emissions. The later 1990 EPA report advocates an extended set of instruments beyond regulations and standards including a number of market instruments such as carbon taxes and other financial mechanisms; institutional instruments such as assistance and loan programs; and technological instruments such as energy R&D funding.

Other assessments produced by some federal agencies reflect a firm policy stance of the White House. A 1985 DOE assessment report (DOE [1985]), providing support for the Reagan administration's policy position of no committed action, advocated continued research rather than policy action citing key unresolved scientific uncertainties.

Rather than providing support for a policy stance already held by the administration, some assessments prepared by federal agencies have played a significant role in bringing attention to certain policy instruments. One report in particular is the 1991 "Comprehensive" report prepared by Richard Stewart and Jonathan Wiener of the Justice Department (Stewart and Wiener [1991]). As discussed earlier, the ideas presented in this report were prepared at the explicit request of the Bush White House to provide recommendations for appropriate policy responses to the climate negotiations. The concepts put forth in this report were presented by the US at the first INC meeting in February 1991 and are still an integral part of the US's current policy position.

The recent formation of the Interagency Analysis Team is an important example of an assessment process that is specifically set up to inform policymakers (and also interest groups and the public) on the impacts of various policy options. Although it is too early to tell, such an assessment that is specifically commissioned by policymakers is likely to have a larger impact than those assessments which are developed without such a request.

Individual Policymakers

With each change in the administration, a new political structure including a new set of policymakers in key positions with different levels of knowledge, perceptions, and interests is introduced. There are various channels through which information flows to policymakers which influence policymakers' knowledge and perceptions of policy instruments. Although formal (i.e., report-like) assessment documents like the IPCC assessments reports have had less of a direct influence on policymakers, information found in these documents have taken an indirect route to these policymakers through

advisors. These advisors are many times directly involved in the assessment process and are able to transfer the knowledge gained in the process to policymakers in the form of briefings. As discussed previously, many policymakers lack the time and expertise necessary to understand the tradeoffs between the various policy instruments. This can lead policymakers to depend heavily upon their advisors (e.g., the Council of Economic Advisors, university professors) trained in economics to propose the appropriate action to take.

Individual policymakers can also play the role of a "policy entrepreneur" by advocating the use or disuse of particular instruments. Notable examples include the promotion of the "no-regrets" strategy in 1990 by then-Secretary of State James Baker and the promotion of market-based approaches (in particular, emissions trading) by Tim Wirth, Undersecretary of State and former Senator. Deliberate attempts have also been made to inform the public. Vice President Gore's scheduling of public workshops to be held on the issue across the country in mid-1997 is a deliberate attempt to inform the public in hopes that public acceptance of a binding commitment will be achieved.

Academics and researchers

As previously discussed, the source of most of the instruments found in the pool of policy instruments is the academic and research community. Individuals within academia or the research community not only generate policy instruments that go into the pool, but can also play the role of "policy entrepreneur" by advocating the use of certain instruments. One example of this is the Project '88 report (Wirth and Heinz [1988])--edited by Robert Stavins at the request of Senators Heinz and Wirth--which advocated the use of market instruments where appropriate to deal with domestic environmental problems. This report brought the idea of market instruments to the attention of Senator Wirth who is now a key climate policy maker and negotiator within the Department of State.

Assessment bodies such as the National Research Council (NRC) and the Intergovernmental Panel on Climate Change (IPCC)--bodies made up of distinguished scientists and researchers--were established to inform the policy community through vehicles such as formal (i.e., report-like) assessments. With regard to policy instruments, these formal assessments have played a lesser role than some of the "informal" assessments (e.g., memos, reports) discussed above in defining which instruments are seriously considered in policy discussions. The early NRC reports (NRC [1977], NRC [1979], and NRC [1983]) focus more on the science and avoid making policy recommendations other than to advocate increased research funding. The NRC [1991] report discusses mitigation and adaptation options but does little to recommend the implementation of particular policy instruments to induce the policy measures (e.g., increased energy efficiency and conservation) highlighted in the report.

The IPCC's First and Second Assessment Reports (IPCC [1990], IPCC [1995]) go further in discussing particular mechanisms for implementing desired response strategies. The 1990 IPCC report, "Climate Change: The IPCC Response Strategies," presents a comprehensive list of possible instruments (i.e., regulations, emissions trading, emissions charges, subsidies, and sanctions), but does not explicitly advocate the use of any

particular set of instruments. The IPCC's Second Assessment Report (IPCC [1995]) also includes a chapter on policy instruments and takes an approach similar to the First Assessment Report by presenting the full suite of instruments without recommending the use of any particular set of instruments.

Lastly, vehicles other than assessment reports can be used by academics and researchers to press for particular policy responses. One example is the recent "economist's statement" signed by 2000 members of the American Economic Association and others which asserted that "the most efficient approach to slowing climate change is through market-based policies" and that "in order for the world to achieve its climatic objectives as minimum cost, a cooperative approach among nations is required--such as an international emissions trading agreement." This statement, sponsored by the non-profit organization Redefining Progress, was sent primarily to members of the AEA for endorsement and distributed to "leaders in the public and private sectors" and to the media at a press conference held February 13, 1997. This statement was received with mixed response by those in the government--some holding it up as an endorsement of the US's current policy position while others feeling that the economists were "speaking out of turn." The statement seems to have done little except to provide support for the US's push for an international emissions trading program.

The "Issues" Stream

As depicted in Figure 1, the policy issue at hand also influences the type of instruments that rise to the top of the policy instruments pool. As is the case with most policy issues, the evolution of the climate change issue over time has involved various policy stages--each supporting a different policy goal. The goal in the early stages of the climate change issue was to determine whether human activities had any discernible influence on the global climate. The issue then entered a policy stage where the goal was to acquire international cooperation to address the issue and has now entered a stage where agreement on an environmental goal and how to best achieve it is the policy goal.

These shifts in the U.S.'s climate change policy goals over time are reflected in the type of policy instruments prominent in policy discussions over time. From the 1970's until the late 1980's the "policy goal" was to determine whether a climate change problem existed resulting in policy responses of the "technological" type—i.e., increased funding in climate research and, until the 1980's, increased funding in energy R&D.

Policy instruments were added to this portfolio once it became apparent that a climate problem likely existed and the policy goal shifted to one of obtaining international agreement on the issue. This goal required instruments that would persuade the various countries to participate in an agreement—an "institutional" instrument (the Global Environmental Facility) to obtain developing country participation and a "market" instrument (e.g., joint implementation) to obtain developed country participation. After the signing of the FCCC in Rio in 1992, the policy goal shifted to achieving committed action from each of the participants. Since the US will be obliged to cover a large share of the total cost of any agreement, the US needs to propose instruments that could lower

this cost significantly in order to gain public acceptance for a binding commitment. Such instruments are found in the recent protocol submitted by the US—international tradable permits and joint implementation, banking and borrowing, and multi-year carbon emissions budgets.

Up to the signing of the FCCC in 1992, the policy process was one of first determining the policy goal and then choosing the appropriate instrument to achieve that goal. However, it is not the case that the means (i.e., the policy instrument) and end (i.e., the policy goal) can be easily separated. In reality, environmental policy goals are a function of costs—the lower the cost, the stricter the goal. Economists argue for environmental goals based on cost-benefit—i.e., an optimal level of abatement where total net benefit is maximized or the abatement level where marginal benefit equals marginal cost. However, in actuality policymakers choose environmental goals based on costs and political considerations with little attention given to benefits. That is, policymakers prefer an environmental goal that is reasonable from a cost standpoint to achieve universal participation with the thought that if costs turn out to be lower, the goal could be made stricter.

This is the clear strategy in the recent international negotiations over targets and timetables. It is likely that an arbitrary goal based on the ability of all participants to reach it will emerge with little thought given to whether this goal achieves the objective of the FCCC to stabilize "greenhouse gas concentrations...at a level that would prevent dangerous anthropogenic interference with the climate system"—a statement which seems to suggest a firm environmental goal.

The Influence of Time and Historical Experience

The passage of time and historical experience have a large influence on policy instrument prominence. In addition to the deliberate attempts by "policy entrepreneurs" to promote particular instruments, the simple passage of time may also increase the public's and policy community's comfortableness with certain policy approaches. This could be the result of increased experience with particular instruments in another policy setting or the length of time the policy instrument has been discussed in policy circles. As implied in Kingdon's concept of "softening up" or Lindblom's concept of "incrementalism" (Lindblom [1959])--i.e., new policies are typically the result of incremental changes to existing policies rather than comprehensive rational decision-making across all policy options--the public and policy community are inherently risk averse and thus reluctant to support large policy changes. They prefer policies that have been proven successful in the past or in other policy settings, or are incremental changes to policies already in place.

Emissions trading is a prime example of an instrument that has risen in popularity in a large part as a result of time and historical experience. Prior to the 1980's, regulatory instruments (e.g., technology or performance standards) were the instrument of choice in the US to deal with domestic environmental problems. The US began experimenting with domestic emissions trading with the introduction of the EPA's Emissions Trading Program in 1974. This was followed by the Lead Trading program initiated in 1982, CFC

trading in the late 1980's, and SO_2 trading as part of the Clean Air Act Amendments of 1990.[xxxv]

Much of the stimulus behind the US's current proposal for an international tradable permits program comes from the "success" of the Acid Rain SO_2 Allowance Trading program. This program is considered successful for a number of reasons, especially: (a) allowance prices have turned out to be much lower than expected; and (b) the program was supported by both industry and environmental groups.

Historical experience is also a major factor in explaining the recent shift in emphasis away from joint implementation and institutional instruments such as the GEF to an international emissions trading program. Although the current international joint implementation program (i.e., "Activities Implemented Jointly") does not allow for project credit, problems such as transactions costs associated with the project-based and single-year target features of a joint implementation program limit the ability of such a program to achieve the magnitude of reductions necessary to contend with the climate change problem.[xxxvi] Recent experience with the GEF also suggests that such a mechanism is unable to reach the necessary level of technological cooperation between developed and developing countries.[xxxvii]

Lastly, the importance of "institutional history" should not be overlooked since once an institutional structure is put in place, it is difficult to get rid of it. Institutional history in some sense guarantees the coexistence of multiple policy instruments since mechanisms such as the GEF and joint implementation are unlikely to be dissolved. Instead, policy instruments are incrementally added to the portfolio of policy instruments already in existence. The reality of institutional history means that policymakers must account for policy instruments already in place when deciding which to add to the portfolio. Therefore, existing instruments also constrain a policymaker's choice of instrument.

The reality of institutional history can also lead to a strategic choice of policy instruments. Although it may seem premature to worry about the type of instrument to implement prior to deciding the goal, by pushing for the implementation of an Annex 1-only international tradable permits program the US is in some sense guaranteeing that such a mechanism will be used when non-Annex 1 countries are brought on board. Schmalensee [1996], however, highlights the pitfalls of such a strategy by pointing out that initially leaving developing countries out of an international tradable permits program could make these countries reluctant to join later since in the interim these countries are likely to specialize in production that involves high carbon-emitting processes.

The "Policy Window"

Combining the Three Streams

In Kingdon's model, the combination of problem with solution occurs when the three streams come together in a "policy window"--i.e., a window of time when political and

economic conditions allow for the joining of a particular solution with an existing policy issue. In an attempt to uncover these possible "joinings" over time, a juxtaposition of the three streams plus a list of actions taken over time is provided in Figure 2.

What emerges from a comparison of the three streams is their seemingly independence from one another and the dominant role external events and issue momentum play in the actions taken over time. Although the formal assessments listed under the "policy options" stream at times echo the US's current policy position, few seem to have been a major factor influencing this position. In fact, in many instances there seems to be a disconnect between the policy position held by the US and the recommendations put forth in the assessments. Although formal assessments seem to have had little direct impact on US policy positions, it may not be the case that they have had no indirect impact or will fail to have a larger impact in the future.

The Role of Formal Assessments

As discussed above, the channels through which information flows to high-level policymakers is usually in the form of discussions with advisors (e.g., the Council of Economic Advisors and university professors), briefing documents, and memos—not formal assessments. Formal assessments, however, are many times the source of information. For instance, many policy advisors are involved in formal assessments processes like the IPCC. Therefore, information found in formal assessments are likely to be passed on to policymakers but through different channels. In my discussions with one of the authors of chapter 11 ("Policy Instruments") of the IPCC's Second Assessment Report, I was told that the intended audience of the chapter was not so much policymakers involved in the international negotiations, but rather those who would be advising these policymakers on matters of policy instrument choice. Given the importance of advisors in policymaking, this seems like the appropriate choice. Also, assessments are used in many cases to support an already developed policy choice. This would suggest that assessments with recommendations that support an existing view would have a larger impact although it may not be the case that the assessment actually informed that view.

Another possible explanation for the seemingly lack of impact assessments have had over the years may be that in the past the overarching policy goal that assessors assume when making policy recommendations has been vastly different from the policy goals that policymakers actually face. As discussed earlier in this paper, the climate change issue over time has entered various stages in the issue evolutionary cycle--each supporting a different policy goal. There are various goals that must be achieved prior to setting a specific environmental goal—e.g., obtaining universal participation in an international agreement. However, it seems that a well-specified environmental goal (e.g., stabilizing carbon emissions at 1990 levels) is typically what assessors assume when they weigh the various policy options. This environmental goal may not be the goal that policymakers are striving to achieve at the current stage of the issue cycle. Rather than being irrelevant, however, the assessment's recommendations may just be premature. If this hypothesis is correct, then it seems that the lack of direct impact of assessments may

change in the near future as the policy goals of policymakers begin to shift towards environmental targets and the gap between the policy goals of policymakers and assessors narrows.

Lastly, reflecting the general theme of this paper, the discussion of policy options and policy instrument choice in assessments tend to overlook the contextual factors that constrain the types of instruments policymakers can actually consider. This point is also stressed by Kingdon: "Proposals that fail to meet these criteria--technological feasibility, value acceptability within the policy community, tolerable cost, anticipated public acquiescence, and a reasonable chance for receptivity among elected decision makers--are not likely to be considered as serious, viable proposals....A proposal that survives usually satisfies these criteria" (Kingdon [1995]). For instance, chapter 11 of the IPCC's Second Assessment report provides a comprehensive list of all possible policy instruments without consideration for which instruments are politically feasible. The "Comprehensive" report, on the other hand, seems to reflect the constraints that policymakers were facing at the time and has had more of a direct impact.

Tom Schelling has emphasized that, in the case of policy instrument choice, economists tend to focus too much on elegant instruments and not enough on instruments that are politically feasible.[xxxviii] This fact could help explain the lack of direct impact assessments have had in terms of policy instrument prominence.

What Constitutes A 'Successful' Assessment?

In light of the discussion above, we can begin to ponder what would it mean for an assessment to be considered "successful." In terms of policy instrument choice, possible criteria for "success" emanating from the discussion in this paper could include the following:

Was the assessment instrumental in advancing the environmental issue to the next stage in the issue cycle?

Informational factors such as formal assessments can influence policy instrument prominence indirectly by affecting the current policy goals policymakers face. Applying this criterion, it would seem that the Villach 1985 assessment should be considered successful since it was a significant factor in shifting the policy goal from one of determining whether a climate change problem exists to achieving international agreement on concerted policy actions.

Did the assessment contribute to the loosening of constraints that define the set of "feasible" policy instruments?

Informational factors can also affect (a) the contextual factors found in the "politics/economics" stream (i.e., political and economic climate; public knowledge and perceptions; and the knowledge, perceptions, and ideology of policymakers within the administration and Congress), and (b) the opinions of the policy community. By

educating the public and interest groups, an assessment can loosen the constraints on the set of feasible policy instrument thus allowing policymakers to make a better policy instrument choice. Although not a formal assessment, an example of a conscious effort to loosen these constraints is the current administration's scheduling of a series of public workshops to be held across the country in hopes of raising public concern over the climate change issue.

Did the assessment provide policy-relevant information to the policymaker which allows he or she to make a more educated policy instrument choice?

Informational factors can also influence a policymaker's knowledge, perceptions, and interests. For example, involvement in the Project '88 report likely helped sell then-Senator Tim Wirth, a previous adversary of market-based approaches, on the merits of market-based instruments and likely convinced him that these instruments were consistent with his political ideology. Wirth, now Undersecretary of State, seems now to be one of the primary "policy entrepreneurs" of international emissions trading for climate change within the current administration.

Conclusions

The intent of this paper was to investigate the factors influencing which policy instruments are seriously considered and promoted by the US in the international climate change debate and to illuminate the channels through which information flows to policymakers. This paper finds that policy instrument prominence is dependent on the following three streams and the influence of time and historical experience: (1) the "politics/economics" stream which contains contextual factors (such as national mood, macroeconomic conditions) that constrain the type of policy instruments policymakers can consider; (2) the "policy options" stream which generates and promotes particular policy instruments; and (3) the "issues" stream which contains the policy goals faced by policymakers at the time. Informational mechanisms such as formal assessments can affect each of these factors in the following ways: (a) by providing information directly and indirectly to policymakers, the public, and the policy community which causes a shift in their perceptions, knowledge, and/or interests; (b) by influencing contextual factors that constrain the feasible set of instruments; and/or (c) by providing information that causes a shift in policy goals.

One goal of this research was to begin to think about what constitutes a "successful" assessment from the standpoint of policy instrument choice. This paper advocates that an assessment should be considered "successful" if it (1) advances the issue by affecting underlying policy goals; (2) loosens binding constraints on the set of "feasible" policy instruments allowing policymakers to make a better choice; and/or (3) provides policy-relevant information to policymakers to allow them to make more educated policy instrument decisions.

As stated in the introduction, this paper focuses on international policy instrument choice. However, the importance of considering domestic policy instruments in conjunction with international policy instruments should not be understated. As emphasized in Vernon [1995] and Stavins [1996], domestic policies and international policies should not be decided separately. The success of one largely depends on the other, and the policy instrument chosen for one context will affect the instrument chosen for the other. However, simultaneous consideration of both policies (domestic and international) is not the US's current approach and further research is needed to explore the ramifications of this.

Lastly, this paper focuses solely on the US and on the climate change issue although most of the lessons learned could be applied to other countries and other environmental issues. An interesting next step of this research would be to conduct comparative studies of the US and other countries, and of climate change and other environmental issues.

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Figures

FIGURE 1

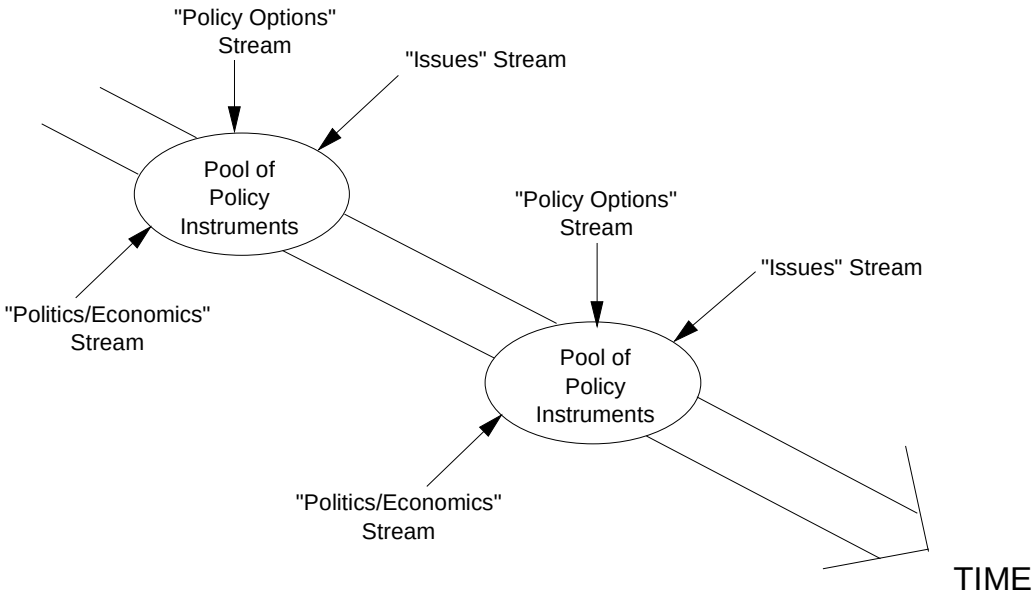

Figure 2

	"Politics/Economics"	"Issues/goals"	"Policy Options"	"Actions"
1976 - 1980	--1978: Second Energy Crisis of the 1970's --Serious inflation	--Do human activities have an influence on climate?	--1977: NRC asst: no policy options discussed--more research recommended --1979: NRC asst: science-based--no policy options discussed--more research recommended	--early 1970s: Climate Impact Asst Program (CIAP) established --1978: Nat'l Climate Program Act--established NCPO
1980 - 1984	--Change in administration (Republican) --increase in support for conservative views (e.g, anti-regulatory, smaller govt) --"preserve status quo"	--Is there enough evidence to warrant climate policy action?	--1983: EPA asst: discusses taxes and fuel bans --1983: NRC asst: recommends more research to address scientific uncertainties	
1984 - 1988	--1985: Discovery of the ozone hole --increased public concern over environmental issues --1988: Warm summer--heightens public concern over climate change	--Is there enough evidence to warrant climate policy action?	--1985: Villach report--consensus statement-"rise in global temp expected by mid-next century" --1987: WRI asst: policy action needed --1988: Toronto conference: call for 20% reduction in CO2 emissions --1988: Project '88 report: mkt-based approaches advocated	--1987: Global Climate Protection Act --1988: IPCC established

	"Politics/Economics"	"Issues/goals"	"Policy Options"	"Actions"
1988 - 1992	--Change in administration: Bush "Environmental President"	--International cooperation to address the climate issue		--1989: USGCRP established
				--1989-1990: Noordwijk and Bergen mtgs attended by env. ministers
	--1990: Persian Gulf war		--1990: EPA asst: discusses full suite of instruments including mkt-based, institutional, and regulatory	--1990: Second World Climate Conf: US refuses to agree to binding emissions target
			--1990: IPCC FAR: response strategies--presents full suite of instruments	--1990: US adopts "no regrets" strategy
	--early 1990s: economic slowdown in US			--1990: Clean Air Act Amendments: establishes domestic SO2 trading mkt.
			--1991: "Comprehensive" report by Justice Dept.--introduces concept of "comprehensive approach"	--1991: GEF established as pilot program
			--1991: NRC report: few instruments discussed	--1990-1991: Series of INC mtgs leading up to 1992 UNCED
			--1991: OTA asst: full suite of instruments discussed	--1992: UNCED

	"Politics/Economics"	"Issues/goals"	"Policy Options"	"Actions"
1992 - present	--Change in administration (Democrat)	--What measures should be implemented to best address climate change?		--1993: Clinton proposes BTU tax
				--1993: Climate Change Action Plan: voluntary measures and extensions to existing programs.
				--1993: USIJI established
	--1994: Republican majority in Congress		--1995: IPCC SAR--discernible human influence--full suite of instruments presented	--1995: COP1: establishes AIJ pilot phase program
				--1996: COP2: nat'l programs not working--more serious action needed
			--1997: "Economists' Statement": advocating market-based approaches and international emissions trading	--1997:US protocol submitted: includes proposal for emissions banking, borrowing, trading, and budgets.
				-1997: Interagency Analysis Team established under Commerce Dept.
				1997: Series of public workshops

Endnotes

[i] The author is a Ph.D. candidate in Public Policy, Kennedy School of Government, Harvard University. In this research the author benefited from discussions with William Clark (John F. Kennedy School of Government, Harvard University), John Holdren (John F. Kennedy School of Government, Harvard University), Dale Jorgenson (Harvard University), Nancy Kete (US EPA), Henry Lee (John F. Kennedy School of Government, Harvard University), Jonathan Pershing (US Department of State), Raymond Prince (US DOE), Thomas Schelling (University of Maryland), Stephen Schneider (Stanford University), and Robert Stavins (John F. Kennedy School of Government, Harvard University).

[ii] For a discussion of the factors influencing *domestic* policy instrument choice, see Keohane, Revesz, and Stavins [1997].

[iii] This section draws heavily from information provided in Festa, Hart, and Diehl [1990].

[iv] This section draws heavily from information provided in Festa, Hart, and Diehl [1990].

[v] de Sa and Holdren [1997]

[vi] Festa, Hart, and Diehl [1990].

[vii] The Villach statement essentially said that a rise in global mean temperature is expected by the middle of next century. See Franz [1997] for an elaborate discussion of the events and issues surrounding the 1985 Villach report.

[viii] Agrawala [1996].

[ix] Ibid

[x] Reinstein [1993]

[xi] Ibid

[xii] Ibid

[xiii] Ibid

[xiv] Wiener [1995]

[xv] Ibid

[xvi] Ibid

[xvii] Reinstein [1993]

[xviii] Ibid

[xix] Ibid

[xx] Ibid

[xxi] Meetings of the Conference of the Parties (COP) replaced the INC as the Convention's primary negotiating process after the INC-11 in February 1995.

[xxii] Hahn and Stavins [1991]

[xxiii] Hahn and Stavins [1991]

[xxiv] Keohane, Revesz, and Stavins [1997]

[xxv] Beder [1996]

[xxvi] Reinstein [1993]

[xxvii] Reinstein [1993]

[xxviii] Hahn and Stavins [1991]

[xxix] As pointed out in Keohane, Revesz, and Stavins [1997], it is not necessarily the case that market-based instruments will result in lower costs to the industry than other instruments. Market-based approaches result in lower aggregate costs to *society* but not necessarily to the industry affected.

[xxx] Stavins and Whitehead [1996]

[xxxi] Beder [1996]

[xxxii] Keohane, Revesz, and Stavins [1997]

[xxxiii] Stavins and Whitehead [1996]

[xxxiv] Hahn and Stavins [1991]

[xxxv] Stavins and Whitehead [1996]

[xxxvi] Parson and Fisher-Vanden [1997]

[xxxvii] Countries like the US are hoping that a joint implementation program between developed and developing countries and ODA decisions based on environmental considerations could serve as alternatives to the GEF.

[xxxviii] Tom Schelling—University of Maryland, personal communication