

**Energy and the Environment:  
Issue Framing in Presidential Debates**

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## Executive Summary

Issue framing, or the definition of a problem as it relates to other issue areas, is an unavoidable aspect of discussions of issues and policy areas. By strategically framing an issue or event, actors have the ability to bring attention and interest to an issue, opening or closing a political window for action. Academic discussions of framing have focused on the effects of these frames on public sentiment and understanding. When analyzed an independent variable, a frame has a great effect on the public's perception and interest in an issue. There have been few discussions of frames as *dependent* variables, or the product of other factors. Though there have been some discussions of frame formation, there have been remarkably few empirical studies or quantitative analyses.

Most of previous analyses have addressed framing in media; newscasters regularly have the public's attention and can be instrumental in developing the discussion of a news event. A few studies have addressed framing in politics, looking at campaigns and primaries specifically for framing effects. These studies have identified significant impacts of individuals on debates and discussions, showing that candidates do have the ability to frame both political debates and subsequent media spin. However, they have not addressed the other factors that determine these frames, focusing instead on the effect of the candidate on the frame, or the effect of the frame itself.

Environmental issues in particular are highly impacted by their frames because they relate to so many other policy arenas, from health and education, to the economy and jobs, to foreign policy and military strategy. Thus, the definition of an environmental issue frame matters

greatly. Because the 2008 democratic primaries are a very dominant aspect of the current news cycle, receiving unprecedented public attention and involvement, this public stage is ripe for analysis of strategic framing.

In order to assess the factors of development of environmental issue frames in this political context, I analyzed the presidential debates in two steps. Firstly, to determine the impact of external factors such as dominant foreign policy issues, I analyzed previous national debates between the Republican and Democratic candidates in the period 1976-2004. By comparing between elections that occurred over a variety of foreign and domestic policy situations, I found differences in the scope and degree of the environmental issue discussion. Secondly, to focus on one time period with relatively constant external policy situations, to determine the impact of other debate characteristics on the environmental discussion, I analyzed 13 debates in the 2007-2008 Democratic primary season. By including the effects of the debaters present, the moderator, and the location of the debate, I found significant relationships between various debate characteristics and the environmental framework.

Therefore, environmental frames can be modeled as dependent variables, or outcomes of exogenous factors such as current foreign policy, and debate moderators. This gives strong evidence of issue frames as outcomes, not simply political strategies that are purely chosen by the actors. Furthermore, this study shows that it is possible to identify causal relationships and model this process. With numerous significant relationships identified, this study shows that it is possible to quantitatively model a previously qualitatively modeled sociological phenomenon

Specifically, I found that foreign-focused debates were less likely to be connected to environmental issues than economic-focused debates. Furthermore, a health frame was more common when the environmental question was asked later in the debate. An energy frame was more common with increased attention to economic issues and less common with increased foreign focus.

Beyond merely an academic pursuit, these findings are highly relevant in a political context. Because these debates are not only receiving public attention whereby the speakers have a national audience to address, this is also a contest for the highest office; one of the candidates will likely be the next President of the United States. Thus, not only is this the largest public stage from which to define the discussion and set the political agenda, but one of these candidates will actually be following-up on their promises, forming the next era of environmental policy. How the issues are defined will determine how they are pursued in the future political sphere. Thus, my findings suggest future environmental policy will be heavily economic in its focus, and less correlated to foreign policy than predicted. This may imply that climate change mitigation is more likely to be addressed in the formation of green jobs and tax incentives, than a push for ratification of the Kyoto Protocol.

## **Background**

Issue framing is a relatively abstract process, whereby an issue becomes defined in its relationship to other policy issues and topics. Inherently, issue framing is unavoidable, in that a frame will be defined in the process of any discussion. However, this can also be a strategic choice, by defining an issue in its relationship to another issue, the topic can gain or lose public interest by capitalizing on the momentum of the related issue.

### *Issue Framing*

Framing has previously been studied predominantly as an independent factor. Though the topic is vague and difficult to specifically determine, there have been numerous studies that empirically assess the impact of various frames as independent variables, showing dramatic effects on belief importance (Nelson and Oxley 1999), comparing general and specific frames (Jacoby 2000), gain and loss frames (Tversky and Kahneman 1981, Highhouse et al 1996) or group effects (Nelson and Kinder 1996). It is clear that framing has a very causal and highly significant relationship with the public perception and understanding of issues. Because of the strong effects, issue framing has become a very powerful political tool, determining which issues are addressed and how, while others stagnate (Lawrence 2004).

### *Environmental Issue Framing*

In the environmental field, issues can be framed in many different ways, and thus issue framing is even more critical to a topic's eventual progression on the policy agenda, or stagnation (Bardwell 1991, Taylor 2000). For example, by defining environmental issues as health issues, (air pollution and its relationship to asthma, etc), pollution becomes part of the

healthcare discussion and is more likely to be addressed than if it were defined as another topic area with less political momentum. Similarly, when domestic interest is tuned to foreign policy, the definition of environmental issues as instrumental aspects of foreign relations, through the impact of Oil Producing and Exporting Countries (OPEC) on the US economy and military strategy, environmental issues can be defined in these terms to achieve movement. A third common environmental frame is that of the environment itself, a moral or religious perspective that discusses environmental protection for the purpose of preservation, not in relation to other issue areas. While environmentalism for the sake of the environment has steadily grown as a frame or interest area ever since Rachel Carson's *Silent Spring*, this perspective has recently gained additional attention with growing knowledge of global climate change.

Climate change is related to numerous other issue areas, and can thus be framed in many ways. This environmental phenomenon has equity issues, in that it will disproportionately affect the developing world, and can be defined in the realm of environmental justice (Park and Miller 2006). It will also monumentally impact the global economy, both in terms of mitigation and climate damages, and can thus be defined economically. As a global issue, climate change also has aspects of foreign policy in the development of treaties and need for international cooperation, and can be defined in this way.

While climate change has the potential to be defined in any of these or other relationships, it is often defined simply as an environmental issue, related to environmental protection itself and not these other issue areas. By creating a moral imperative for action, with either religious or simply ethical associations, climate change activists such as Al Gore tend to pull

on the heartstrings or sense of duty of their audiences, as they call for action in the reduction of energy use and production of greenhouse gases. Within the timeline of this study, former vice-president and presidential nominee Al Gore was awarded the Nobel Peace Prize for his work on global warming and the success of his film, *An Inconvenient Truth*. His success and public attention brought the issue even closer to the forefront of politics and public interest, giving more strength to the definition of environmental issues in the moral or preservationist frame.

#### *Politicians as framers*

Usually, the media is the dominant actor in issue framing. By choosing how to tell a story, the media determines how the public responds to an issue or event (Scheufele 1999). While the media is a powerful actor in issue definition, politicians also have a public stage from which they can define frames during campaigns (Stromback and Aalberg 2008). Strong correlations have been found between candidates and issue discussions, showing that the candidates can define media discussion as well as public perception. There are also significant differences between candidates in this relationship, whereby some are simply more influential than others (Tedesco 2001, 2005).

During the campaign season, a candidate produces numerous press releases, campaign videos and commercials, and countless speeches on the campaign trail. These releases have been studied for their effect on national media, but are fine-tuned to the intended audience, and may be unrepresentative of the grander discussion. Instead, a nationally-broadcast debate forces the candidates to present their policy perspectives to a broader audience, while being forced to defend their accusations and differences to the other candidate(s).



Furthermore, a national debate which addresses a large audience has a greater likelihood of setting a national policy agenda than any other single press interaction.

Within a debate, discussion can be divided between strategy frames, where candidates discuss each other's flaws and downfalls, and issue frames, where candidates debate the strengths and weaknesses of issue areas, policies and particular proposals (Rhee 1997).

While these debates are very relevant as highly publicized public stages for discussion and issue framing, this context is also important politically. Not only do the candidates define the debate for the media and subsequent public perception, they are defining their platforms. One of the candidates from the democratic primary will be the nominee, and possible next President of the United States. As the highest office, this position has more influence than any other in the formation of national policy (Neustadt 1960). Therefore, how the candidates discuss the issues now has enormous significance in the formation of the next era of environmental policy. As the Congress debates energy policies to address climate change with varying levels of emissions reductions through increased alternative fuels or efficiency reductions, the next president will have enormous impact on the US involvement in this issue. Other topics may include the continuing discussion of drilling in the Arctic National Wildlife Refuge, or subsidies to nuclear power. Statements made now by candidates will be addressed later, as they follow-up on campaign promises. Thus, the formation of the discussion greatly impacts what future policy will be.

### *Dependent variables*

While there have been numerous studies of these frames as independent factors on public perception, the development of a frame as a dependent variable, is very poorly understood. This process has been a predominantly vague study based in sociology or psychology (Entman 1993), remaining predominantly qualitative, not quantitative (Brosius and Epps 1995).

However, I hypothesize that quantitative models can be used to identify the effect of certain debate characteristics on the discussion of issues, and environmental issues in particular. By analyzing external factors, such as the state of foreign affairs or dominant domestic issues, and factors of the debate itself such as the moderator, number of speakers, or location of the debate, we can better assess the process of frame formation. This is an institutional argument, diminishing the role of the individual in making this political strategic choice.<sup>1</sup> While both arguments are possible, political analysts tend to favor one perspective over the other as the dominant explanation for political decisions and processes (Mayer 1998).

First, within my definition of environmental frames as being either (1) health related (pollution and health interactions), (2) foreign policy related (military interests and treaty-formation) or (3) purely environmental (preservation as defined by John Muir), I hypothesize that environmental issues will be defined in the health frame when the discussion is focuses on social issues such as health care, and foreign frame when the discussion is non-

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<sup>1</sup> According to Mayer's framework, the policy process is either institutional, meaning that the policy-maker acts in a way that can be predetermined by the responsibilities and restrictions of his office, or it is a rational-choice, where the policy-maker cognitively assesses the alternatives and chooses the option that maximizes his criteria (Mayer 1998).

domestically focused. Thus, the third frame of preservation will be used in situations of general domestic policy discussion.

Second, I hypothesize that there are relationships between external factors and the issue frames, creating a quantitative means to model the formation of issue frames. Thus, beyond differences in the candidates themselves, the debates will be strongly affected by external factors. Just as differences in foreign policy over time will affect the environmental frame, differences between locations will produce difference environmental discussions. Therefore, I predict that debates in more industrial states such as Pennsylvania and Ohio where the economy and job loss are primary concerns, will have dramatically different discussions than South Carolina, which is less dependent on specific industries and may be more impacted by other social issues. As the debates progress, there should also be strong time effects caused by dominant current events (such as the awarding of the Nobel Prize) or foreign policy events (changes in the war in Iraq or tensions with Iran and North Korea).

Therefore, I am assessing the effects of exogenous factors on environmental frames in Presidential debates. First, I look backwards at previous framings in past presidential debates. By looking at previous years in recent history, we can see members of both parties discussing the issues, which helps isolate the impacts of external factors, such as current events and time trends on the environmental discussion. Second, I'm looking at the 2007- 2008 democratic debates. Because these debates are numerous and cover a shorter time span, they can help isolate the impacts of audience and speakers on this framework.

## 1. Historical Perspectives: Analysis of Previous National Presidential Debates

To better understand the current political environment, I first looked at previous debates to gain a historical perspective. In order to cover a wide array of foreign and domestic policy situations, as well as to assess numerous candidates, I assessed all of the national Presidential debates between the republican and democratic nominees in the period 1976-2004 (See Table 1). During this period, the US had a range of political situations varying from the American hostages in Iran, to the post-September 11<sup>th</sup> attacks. I limited the sample to this time frame because the domestic environmental awareness is very similar; this is after the passage of critical environmental policies such as the Clean Air and Water Acts, National Environmental Protection Act and Endangered Species Act of the early 1970s.

First, I assessed each debate transcript in this period observationally to look for trends. Then I used those findings for an empirical comparison between focused and unfocused debates.

**Table 1. National Debates in Previous Elections**

Election winners indicated in bold.

Election Year	Presidency	Democrat	Republican	Debates
1976	39	<b>J Carter</b>	Ford	3
1980	40	J Carter	<b>R Reagan</b>	2
1984	40	W Mondale	<b>R Reagan</b>	2
1988	41	M Dukakis	<b>GHW Bush</b>	2
1992	42	<b>WJ Clinton</b>	GHW Bush	3
1996	42	<b>WJ Clinton</b>	R Dole	2
2000	43	A Gore	<b>GW Bush</b>	3
2004	43	J Kerry	<b>GW Bush</b>	3

## **Observational Analysis**

- **Bush-Kerry 2004**

The focus of this campaign and election was predominantly the war in Iraq; however, the connection to energy and foreign oil was not made at all, leaving environmental issues completely absent. Interestingly, instead of discussing energy through the connection to foreign oil and OPEC, Kerry did mention Kyoto in the frame of treaties with other nations that build alliances; thus it was a treaty like any other international agreement, not discussed for its environmental merits.

The second debate was more general than the first, covering more topics. The President was asked about his environmental record, to which he responded by listing numerous classic environmental topics such as air and water pollution and his healthy forests initiative. He also supported hydrogen technology on the basis of air pollution reduction, not energy savings. When asked about global warming, Bush responded that the basis of his concern with the Kyoto Protocol was American job loss.

- **Bush-Gore 2000**

While it would be easy to argue that Gore was the most environmental candidate for this office, he discussed environmental issues less than could be expected. Instead, the majority of his statements in the debates were more related to general social issues such as abortion, religion and gun control. Gore stated clearly that his biggest policy issue is education reform. Environmental topics were brought up several times in these debates, and framed differently each time. Once in respect to oil prices and national security (2000.1), once in the frame of

environmental health and smog (2000.2), and once in response to the farm bill and land conservation (2000.3).

- **Clinton- Dole 1996**

The first debate covered a variety of topics and issue areas. There were numerous mentions of environmental topics, but no deeper debate and no specifically environmental question. The debate centered on domestic, not foreign policy issues. The second debate was very similar to the first, with a general domestic focus, several vague mentions of environmental topics but no deeper debate.

- **Clinton- Bush 1992**

The first environmental topic of discussion is that of a Gas tax in terms of its economic effect. The debate was very focused on economic topics. There were not environmental questions, and very few generic environmental statements.

“I want to take every dollar by which we reduce defense and reinvest it in technologies for the 21st century--in new transportation, in communication, in environmental clean-up technologies. Let's put the American people to work, and let's build the kind of high-tech, high-wage, high-growth economy that the American people deserve.” (Clinton 1992.1)

The second debate was very similar to the first. There was no environmental question, and very few references to environmental topics. The debate remained very focused on economic concerns. The third debate made a reference to the effect of increased CAFE standards on job loss. Otherwise, it was very similar.

- **Bush- Dukakis 1988**

This was an unfocused, generally domestic debate. The discussion was evenly spread out on numerous social issues, including the war on drugs, HIV/AIDS, and homeless shelters. There was some discussion of foreign affairs, but nothing dominant. There were a few references to general environmentalism, but they occurred late in the discussion and were brief. There was a quick mention of corn-based chemicals and bio-degradable plastics.

“I would hope that from this point on, we get to the issues that affect the vast majority of Americans, jobs, schools, health care, housing, the environment.”

(Dukakis 1988.1)

The second debate was very similar, with a general domestic focus. Environment was mentioned a few times in generic statements, but hardly discussed in specifics. There was one question towards the end of the debate about Bush’s environmental record in regards to water pollution and national parks. Later, on the topic of nuclear energy, Bush supported for expanding nuclear to reduce energy dependence.

- **Reagan- Mondale 1984**

This debate was another general domestic debate with some discussion of economic growth, and then a discussion in depth on Medicare and social security. They talked about numerous social issues, focusing on abortion and religion. The environment came up late and was very brief. Mondale focused on the environment as it relates to health issues, focusing on pollution and the cleanup of toxic sites. Reagan focused on typically green issues, discussing his impact on national parks.

The second debate was dramatically different than the first, and focused almost entirely on foreign policy, specifically on nuclear armament. There was little discussion of the environment or other social issues.

- **Reagan- Carter 1980**

The first debate was somewhat anomalous in that Carter did not attend; instead it was between Reagan and 3<sup>rd</sup> party candidate, Anderson. The environment came up very early, the second question after an economic one, in the topic of energy and foreign policy. Otherwise, this was a very economic, non-social debate.

The second debate was largely foreign or domestic-economy focused. This debate occurred in the time of the Iranian hostage situation, and was dominated by the topic. The environment was brought up quickly in both debates in the frame of energy and foreign independence only, with the green topics completely absent. Air pollution was discussed in response to coal use.

- **Carter- Ford 1976**

The focus of these debates was almost entirely foreign, on the issues of Vietnam, China and the Soviet Union. The domestic focus was largely economic, in the areas of recession, inflation and unemployment. There was very little discussion of social issues.

Environmental issues were predominately brown, or health related. The candidates discussed energy issues in terms of independence from oil importing, with a large discussion of conservation. Carter discussed in length how energy is being wasted and the mandatory and



voluntary measures he would support. Ford supported expanding nuclear power. Late in the third debate, the general environment was discussed in terms of urban renewal and general social policy on jobs and education and race issues.

### **Empirical Analysis**

Based on the observational study, I determined that the focus of the debate was very critical to the environmental discussion. Other interesting variables from each debate included:

- topic of the first question  
    either domestic or foreign
- the focus of the debate  
    either general or focused
- number of times the term “environment” is mentioned
- the first time “environment” is mentioned
- number of words spent discussing the environment
- the dominant environmental frame  
    either general/no dominant, health or energy

By grouping each debate as either general or focused, I then performed a series of student's t tests on each of the dependent variables. Focused debates also were usually more related to foreign issues, while general debates tended to focus on social, domestic issues ( $p = 0.019$ ).

When the debate was unfocused, the environment was mentioned more often, but later in the debate (See Table 2.) Candidates tended to say less, but this is not significant. This

supports my observational finding that general discussions tended to mention the environment often but briefly, while in focused discussions the environment and energy were discussed in depth when related to the dominant concern.

**Table 2. Environment in General and Focused Debates**

Results of student’s t tests between general and focused debates on the number of mentions of environmental topics, the first appearance of a mention, and the total words on environmental questions.

	Mean General	Mean Focused	p value
Environmental Mentions	6.15	1.57	0.005
First Appearance of Mention	4810	1100	0.01
Total words on Env. question	456.46	888.86	0.261

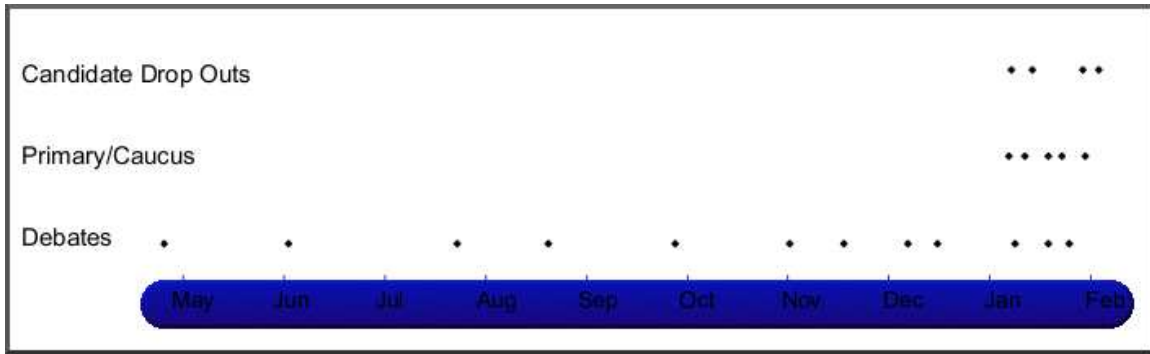
The corresponding frame is less easily determined. It does seem that energy was the dominant frame when the debate was more focused and the first question was foreign- however, these trends do not appear to be significant. When the focus of the debate was general and domestic, environment was more likely to be framed generally or without a dominant frame. When framed as an energy issue, candidates tended to speak much longer about it, and earlier in the debates.

When the debate remained broad, then there tended to be a generic environmental question spanning typically green issues, as well as pollution/health and energy policy. These discussions tended to be vague, with little in-depth policy debate or clear framing.

## **2. Democratic Debates 2007-2008**

To evaluate the current debates, I created several models to address the relationships between the factors of the debate that were external to each individual speaker, as well as the factors that were external to the entire debate, on the environmental performance of the speakers.

I assessed 13 debates that occurred between April 4, 2007 and January 26, 2008. The debates were hosted in several different states, (NH, SC, NV, PA, IA) preceding their primary/caucus by between a few days and over several months. Each debate was broadcast nationally, and moderated by a member of the press. Because I looked at debates through the end of January 2008, the number of debaters is not constant; it fluctuated as debaters could not attend, were not invited, or began to drop out of the race. In the first debate, all eight debaters were present, but in the last, only Edwards, Obama and Clinton remained (See Fig 1).



**Fig 1. Timeline of debates, primaries/caucuses, and candidate drop outs.**

The debates used span the period Apr 27, 2007 – Jan 26, 2008. The primaries that occurred in this period were IA (Jan 3<sup>rd</sup>), NH (Jan 8<sup>th</sup>), MI (Jan 15<sup>th</sup>), NV (Jan 19<sup>th</sup>), and SC (Jan 26<sup>th</sup>), while the candidate drop outs were Biden/Dodd (Jan 4<sup>th</sup>), Richardson (Jan 10<sup>th</sup>), Kucinich (Jan 25<sup>th</sup>) and Edwards (Jan 30<sup>th</sup>).

First, I categorized the debate into issue areas. I removed all debate on generic questions, or non-issue areas. This included a large percentage of debate in some cases, when the candidates focused on attacking each other. Within the issue discussion, I categorized each question and subsequent debate as falling into one of four categories: environmental, foreign, domestic social or domestic economic. Environmental questions were either about global warming/climate change, gas prices, or nuclear energy. Foreign questions included Iraq, Iran, and any other foreign policy area, as well as immigration. Domestic Social included a large range of topics, such as healthcare and education, gun control, racial issues and many current events such as the Jena 6. The category of domestic economic included job growth, interest rates, and taxes. While these categories often overlapped, I remained consistent in categorizing difficult topics between debates (See Appendix 4 for further discussion).

Once categorized, I collected word counts for each question to determine total percent of the issue discussion on each category (env, economic, foreign, social). To assess the

moderator's sense of urgency in addressing environmental topics, I also collected word counts preceding the first environmental question (*appear\_env*). These variables represent the independent variables, or the aspects of the debate that we outside of the debaters control. I also collected basic information about the debate itself, such as the date, speakers, moderator and state.

Next, I assessed the dependent variables, or those variables that debaters were able to control. While the debaters could not control the topic of the questions, or how much time they were allowed to use to answer each question, they were able to speak off-topic at any point. To assess the debaters' interest in discussing environmental issues beyond the questions asked, I counted the incidence of *random mentions*, or instances when environmental topics were discussed in non-environmental questions. I also measured the urgency of the speakers to discuss environmental issues, as the word count preceding the first random mention (*appear\_rm*).

This is the first stage analysis, looking the entire environmental discussion, as a composite of all possible frames. Therefore, random mentions (rms) include any mention of the environment, including energy and efficiency, pollution reduction and cleanup, national parks/forests, and the creation of green jobs. Usually rms were very short and generic statements, such as this comment by Senator Clinton in response to a question about raising taxes:

“The challenge that I'm wrestling with is: How do we realize the savings? Now, I don't think there's any Democrat that is not going to let the Bush tax cuts on the

wealthiest Americans expire. We're all going to do that. So that money will be available. How, then, do we set forth the priorities that we want to address, including energy efficiency, dealing with global climate change and so much else?" (Clinton June 3, 2007)

### ***First Stage Models***

To assess the relationships between each of the independent variables: environment, foreign, economic, social and appear\_env, on the dependent variables rm and appear\_rm, I performed multiple regressions using intercooled STATA 10.0

### *General Models*

The first stage of analysis models the components of the debate that are beyond the debaters' control against the variables that are within their control. These independent variables are the fractions of the issue-orientated conversation that are dedicated to foreign, domestic economic, social or environmental policy questions, as well as the appearance of the first environmental question. The dependent variables are the number of random mentions and the appearance of the first random mention. The first stage analysis of the effect of independent variables of the debate on the independent variables of the environmental discussion is modeled as follows:

$$(1) \quad Y = \beta_0 + \beta_1 T + \varepsilon$$

*Where:*

$Y =$  *dependent variables: rm, appear\_rm*

$T =$  *independent variables: env, foreign, economic, social, appear\_env*

$\varepsilon =$  *error*

### *Fixed Effects*

In order to assess the impacts of additional factors on the relationships between the independent and dependent variables, I considered four variables to serve as fixed effects on these relationships.

First, I considered the state of the debate (model 2). To assess the impact of the state, I created dummy variables for the states of New Hampshire, South Carolina, Nevada and Iowa, leaving Pennsylvania as the baseline.

In order to assess the effect of the debaters on each other (model 3), I created dummy variables to indicate the presence of each individual. However, several debaters always appeared together, and thus their effects cannot be separated. Thus, I created dummy variables for the presence of Richardson, Kucinich, Gravel, and Biden/Dodd. Edwards, Obama and Clinton were all present in all of the debates.

Then I looked at the effect of the moderator (model 4). Only two moderators were recurrent, thus, I created dummy variables for Wolf Blitzer and Tim Russert, leaving “other” as the baseline.

The fixed effects are modeled as follows:

$$(2-4) \quad Y = \beta_0 + \beta_1 T_i + \varepsilon_i$$

*Where:*

*Y = dependent variables: random mention, appearance random mention*

*T = independent variables: foreign, economic, social, env, appearance env*

*i = fixed effects: (2) state, (3) debaters, (4) moderator*

*$\varepsilon$  = error*

### *Composite Models*

Because both the effects of the state and the moderator were very significant, I created a composite model with both effects.

$$(5) \quad Y = \beta_0 + \beta_1 T_{ij} + \varepsilon_{ij}$$

*Where:*

*Y = dependent variables: rm, appear\_rm*

*T = independent variables: foreign, economic, social, appear\_env*

*i = state*

*j = moderator*

*$\varepsilon$  = error*



## ***Second Stage Models***

In order to divide the environmental discussion into its various frames, I created a list of environmental terms and counted the incidence of each term in the entire debate. I then grouped these terms into their relevant frames, being either health/pollution, energy/foreign, or generic/green. I created another division, between the discussion that described the environmental situation, and discussion that addressed *solutions* to the environmental situation. (See Table A5 for term and groupings).

I then performed regression analysis on each of the independent variables from stage 1 on these terms and term groups, modeled as follows:

$$(6) \quad Y = \beta_0 + \beta_1 T + \varepsilon$$

*Where:*

$Y =$  *frame term groups*

$T =$  *independent variables: economic, foreign, social, appear\_env*

$\varepsilon =$  *error*

I also considered fixed effects on the relationships between all independent variables and the terms and term groups modeled as:

$$(7-9) \quad Y = \beta_0 + \beta_1 T_i + X_j + \varepsilon_i$$

*Where:*

$Y =$  *frame term groups*

$T =$  *independent variables: economic, foreign, social, appear\_env*

$i =$  *fixed effects: (7) state, (8) debaters, (9) moderator*

$\varepsilon =$  *error*

The combination model includes the fixed effects of both the state and moderator, but not the debaters such that:

$$(10) \quad Y = \beta_0 + \beta_1 T_{ij} + \varepsilon_{ij}$$

*Where:*

$Y =$  *frame term groups*

$T =$  *independent variables: economic, foreign, social, appear\_env*

$i =$  *state*

$j =$  *moderator*

$\varepsilon =$  *error*

## Results

### *Stage 1.*

In the first stage models, there were no significant relationships between any of the independent variables and the dependent variable `appear_rm`, however, there were numerous relationships with the dependent variable `rm`. there was strong correlation between the number of random mentions (`rm`) and both the environmental (`env`), foreign and economic percentages of the issue debate. Neither the independent variable `social` nor `appear_env` had any relationships, but the percentage of the debate allocated to environmental, foreign and economic questions were all significantly correlated with the number of random mentions. Both environmental and economic percentages had positive relationships, meaning that as the debate was increasingly focused on either area, the number of environmental random mentions increased. However, foreign was negatively correlated in all models.

The inclusion of fixed effects in models 2-4 had significant impacts. In comparison to the general model, the inclusion of the debaters made each model less significant, while both the state and moderator made each model more significant. The composite model (model 5) that included both state and moderator was extremely significant ( $p < 0.001$ ) for `env`, and marginally significant for both foreign and economic.

**Table 3. Significance in Stage One Models**

For each model 1-5 the significant results are indicated where \*:  $p < 0.1$ , \*\*:  $p < 0.05$ , and \*\*\*:  $p < 0.01$ .

	random mentions
<code>env</code>	*1, *2, **4, ***5
<code>foreign</code>	*2
<code>economic</code>	*1, *2, *4

*Stage 2.*

The frame term grouping of health/pollution, energy/foreign, and green/generic each had significant results in one or more models.

The health/pollution frame was positively correlated with the appearance of the environmental question, where an earlier appearance of the environmental question increased the likelihood of a health frame. Other independent variables were not significant. The inclusion of the fixed effects altered the significance, but not the strength, of this relationship. This relationship was most significant when including the effects of states or moderators, but not debaters. The combination model was only marginally significant ( $p < 0.08$ ).

The energy/foreign frame had several relationships that changed dramatically with the inclusion of the fixed effects. There was a strong positive relationship with economic in the combination model, and a strong negative relationship with foreign. There was also a positive relationship with the appearance of the environmental question, though this was only significant in the general model, with marginal significance in models that included the debaters and moderators.

The green/general model had only one marginally significant relationship, a negative correlation with social in the model that included effects of state.

There was no significance in any of the models that assessed the solutions frame.

While the inclusion of the effects of the state and moderators generally increased both the degree and significance of the relationships in each model, the composite model was only occasionally more significant than either individual model.

## **Conclusions**

Firstly, there were numerous instances of significant relationships between independent and dependent variables that remained significant when including covariates or fixed effects. This signifies that quantitative modeling of issue frames as a dependent variable is very possible.

In determining the overall environmental discussion, the percent of the debate spent on either economic, foreign or environmental questions was strongly able to predict how often debaters would mention environmental topics in non-environmental questions, but not how quickly in the debate that would occur.

When the debate was more focused on domestic economic policies, debaters made more off-topic environmental comments, but when the debate was foreign-focused, they made fewer environmental comments. This suggests that the economic-environmental connection was more clearly defined to the debaters than the foreign-environmental connection. This finding is surprising, especially considering Kucinich's strong foreign/environmental policy discussion in early debates.

When the moderator asked more environmental questions, the debaters made more environmental comments in other topics. While I would have predicted that random

mentions were a product of the debaters wanting to talk about environmental issues when confined to other topic areas, this result suggests the opposite. Instead, it seems that when the moderator asked more environmental questions, the entire debate became more environmental. This seems to suggest that the debaters were acting less independently than I hypothesized, where even the times they spoke off-topic are not necessarily an independent function of their interests.

In the second stage models, an earlier appearance of the first environmental question increased the likelihood of a health frame in all models. This may suggest that increased urgency, or perceived urgency, is associated with health threats. Thus, by asking the question earlier, the debaters took the question more seriously as a human health threat.

The energy frame had several marginally significant results that are counterintuitive. While an increase in domestic economic focus increased the energy frame, an increase in foreign focus decreased the energy frame. This is extremely surprising, as the energy frame is the most obvious foreign policy connection to the environment. Instead, the fact that this coefficient was either not significant or marginally significant and switched signs between models suggests that I have failed to define this frame well. The inclusion of different terms may create more consistent relationships with this frame.

Not surprisingly, the vague general/green environmental frame was significant with the vague category of domestic social policy. Thus, as the debate became more focused on this general topic area, the environmental frame became slightly less clearly defined.

The frame of solutions was not significant in any models, suggesting that either I have poorly defined this category, or there are simply unclear relationships.

The inclusion of fixed effects was very important to these relationships, implying that these additional variables are very significant. The state and the moderator often strengthened the relationships between the independent and dependent variables, while the inclusion of the debater variables often weakened the relationships. This suggests that the debaters are even less important to the framing process than I hypothesized.

In total, the state of the debate and the moderator, the appearance of the first environmental question, and the amount of time given to this question were the most important factors in determining the environmental frame. These findings give weight to the argument that policy formation has much less to do with the individual politicians than other external factors. Furthermore, they suggest that future environmental policy will be heavily economically focused, and less foreign policy-related.

In the form of upcoming policy formation, these findings may imply that environmental policy is more likely to be addressed as the nation focuses on the potential economic recession, than if we become focused on foreign policy issues such as Iran. This environmental policy may be more focused on the domestic economy, such as subsidies for rising fuel prices and tax breaks for companies that create green jobs, than other policy possibilities.

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## Appendix 1. Tables and Figures

**Table A.1. List of Variables Used**

Variables	Description
foreign	percent of issue discussion on foreign questions
economic	percent of issue discussion on domestic economic questions
social	percent of issue discussion on domestic social questions
env	percent of issue discussion on environmental question
appear_env	words preceding first environmental question
rm	incidence of <i>random mentions</i> , or discussion of environmental topics on non-environmental questions
appear_rm	words preceding first random mention
topics	incidence of each environmental topic mentioned (See Table A5)
debaters	dummy variables for debaters present (Biden/Dodd, Kucinich, Gravel, Richardson)
state	dummy variables for location of each debate (NH, NV, IA, SC)
moderator	dummy variables for each moderator (Blitzer, Russert)

**Table A.2. Debates in 2007-2008 Democratic Primary.**

date	state	debaters	moderator
27-Apr	SC	Clinton, Obama, Edwards, Richardson, Kucinich, Biden, Dodd, Gravel	other
3-Jun	NH	Clinton, Obama, Edwards, Richardson, Kucinich, Biden, Dodd, Gravel	Blitzer
23-Jul	SC	Clinton, Obama, Edwards, Richardson, Kucinich, Biden, Dodd, Gravel	other
19-Aug	IA	Clinton, Obama, Edwards, Richardson, Kucinich, Biden, Dodd, Gravel	other
26-Sep	NH	Clinton, Obama, Edwards, Richardson, Kucinich, Biden, Dodd, Gravel	Russert
30-Oct	PA	Clinton, Obama, Edwards, Richardson, Kucinich, Biden, Dodd	Russert
15-Nov	NV	Clinton, Obama, Edwards, Richardson, Kucinich, Biden, Dodd	Blitzer
4-Dec	IA	Clinton, Obama, Edwards, Kucinich, Biden, Dodd, Gravel	other
13-Dec	IA	Clinton, Obama, Edwards, Richardson, Biden, Dodd	other
5-Jan	NH	Clinton, Obama, Edwards, Richardson	other
15-Jan	NV	Clinton, Obama, Edwards	Russert
21-Jan	SC	Clinton, Obama, Edwards	Blitzer

**Table A.3. Questions and Topic Areas**

General Topic	Question Topic
Foreign	Iraq Cuba Iran Darfur NAFTA Immigration
Economic	Taxes Minimum Wage Jobs Budget
Social	Racial Issues Abortion- Justice selection Guns Healthcare Education Welfare Healthcare Gay/Lesbian marriage Faith Miners
Environment	Gas Prices Climate Change

**Table A.4. Results of Stage 1 Models**

Results of Models 1-6 on dependent variables appear\_rm and rm, listing both the coefficient of the independent variable (env, foreign, economic, social or appear\_env), as well as its p value. Bold indicates significance  $p < 0.1$ .

appear_rm	1: General		2: States		3: Debaters		4: Moderator		5: Composite	
	coeff	p value	coeff	p value	coeff	p value	coeff	p value	coeff	p value
env	-5607.67	0.86	-2819.04	0.94	11595.44	0.81	-39866.69	0.26	-35089.03	0.34
foreign	6057.27	0.48	4218.79	0.68	4605.61	0.74	8321.73	0.32	11372.49	0.17
economic	-14847.30	0.44	-10466.46	0.62	-4051.93	0.93	-18235.97	0.34	-22191.13	0.23
social	-6859.84	0.60	-4325.08	0.82	-9261.96	0.61	-6944.53	0.61	-16879.64	0.33
appear_env	0.42	0.16	0.47	0.36	0.59	0.18	0.22	0.54	0.30	0.61

rand_ment	1: General		2: States		3: Debaters		4: Moderator		5: Composite	
	coeff	p value	coeff	p value	coeff	p value	coeff	p value	coeff	p value
env	<b>38.78</b>	<b>0.09</b>	<b>41.76</b>	<b>0.09</b>	7.70	0.65	<b>61.27</b>	<b>0.03</b>	<b>77.75</b>	<b>0.01</b>
foreign	-7.18	0.26	<b>-12.30</b>	<b>0.07</b>	-2.29	0.64	-7.54	0.30	-14.27	0.12
economic	<b>26.68</b>	<b>0.05</b>	<b>25.85</b>	<b>0.06</b>	8.54	0.61	<b>27.76</b>	<b>0.08</b>	29.05	0.15
social	-1.08	0.92	12.31	0.37	2.03	0.76	-1.98	0.87	13.58	0.51
appear_env	0.00	0.83	0.00	0.56	0.00	0.98	0.00	0.96	0.00	0.26

**Table A.5. Definition of Frame Term Groups**

<b>Frame Group</b>	<b>Terms</b>
Health/Pollution	Emission Pollution Pollute Water Air
Energy/Foreign	Energy Carbon Oil Fossil Fuel Clean Coal
Environment/General	Climate Change Global Warming Environment
Solutions	Biofuel Biodiesel Solar Wind Alternative Renewable

**Table A.6. Results of Stage 2 Models**

Results of models 6-9, showing coefficient of independent variables economic, foreign, social and appear\_q on frame term groups, health/pollution, energy/foreign, green/general and solutions. Bold indicates marginal significance  $p < 0.1$ .

Health/Pollution	6: General		7: States		8: Debaters		9: Moderator		10: Combination	
	coeff	p value	coeff	p value	coeff	p value	coeff	p value	coeff	p value
economic	-13.71	0.51	-10.65	0.52	18.24	0.67	-13.92	0.56	-5.20	0.81
foreign	-5.12	0.57	1.01	0.90	-11.09	0.35	-5.44	0.60	-1.00	0.92
social	13.64	0.33	-5.14	0.73	9.11	0.58	15.28	0.34	0.53	0.98
appear_env	<b>0.001</b>	<b>0.03</b>	<b>0.001</b>	<b>0.02</b>	0.001	0.12	<b>0.001</b>	<b>0.02</b>	<b>0.001</b>	<b>0.08</b>

Energy/foreign	6: General		7: States		8: Debaters		9: Moderator		10: Combination	
	coeff	p value	coeff	p value	coeff	p value	coeff	p value	coeff	p value
economic	24.41	0.68	35.07	0.55	-75.90	0.49	26.67	0.66	<b>91.86</b>	<b>0.05</b>
foreign	-18.16	0.47	-23.00	0.40	7.63	0.82	-16.29	0.53	<b>-40.87</b>	<b>0.07</b>
social	-10.43	0.80	-4.53	0.93	-35.39	0.40	-5.12	0.90	36.98	0.48
appear_env	<b>0.002</b>	<b>0.02</b>	0.002	0.22	<b>0.002</b>	<b>0.06</b>	<b>0.002</b>	<b>0.06</b>	0.001	0.70

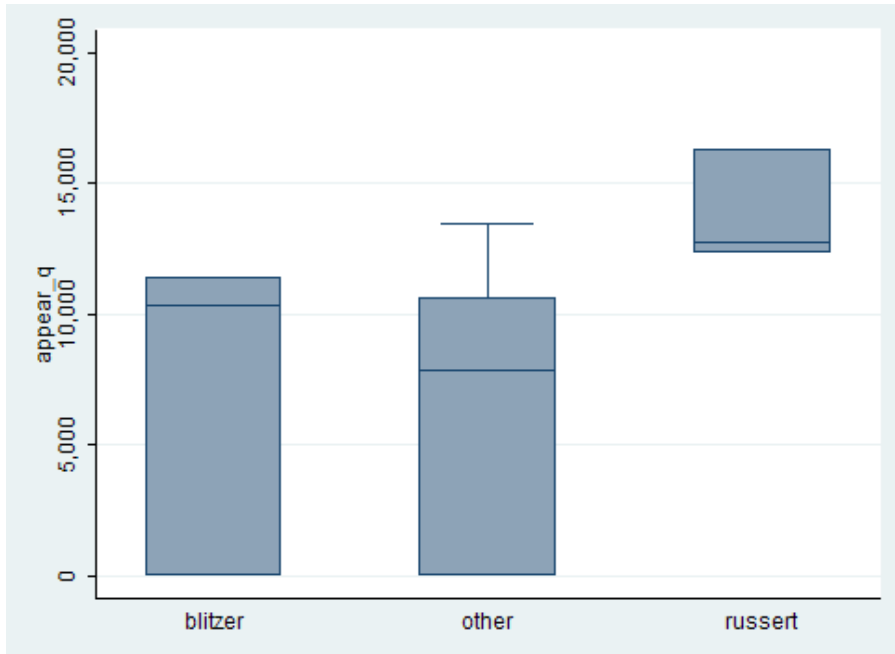
Green/general	6: General		7: States		8: Debaters		9: Moderator		10: Combination		
	coeff	p value	coeff	p value	coeff	p value	coeff	p value	coeff	p value	
economic	-6.88	0.64	-	10.25	0.50	-	27.87	0.32	-3.27	0.84	
foreign	5.57	0.38	7.56	0.28	4.47	0.60	4.02	0.56	4.77	0.56	
social	-12.23	0.21	-	<b>22.63</b>	<b>0.06</b>	-5.91	0.60	-11.15	0.29	-20.20	0.16
appear_env	0.000	0.59	0.000	0.55	0.000	0.88	0.000	0.98	0.000	0.34	

Solutions	6: General		7: States		8: Debaters		9: Moderator		10: Combination	
	coeff	p value	coeff	p value	coeff	p value	coeff	p value	coeff	p value
economic	18.81	0.39	20.26	0.41	-5.20	0.92	16.96	0.49	28.85	0.38
foreign	-9.42	0.32	12.84	0.26	-4.94	0.75	-8.22	0.44	-15.50	0.30
social	0.08	1.00	10.14	0.65	-3.50	0.86	-0.76	0.96	15.55	0.62
appear_env	0.000	0.18	0.000	0.43	0.001	0.12	0.000	0.35	0.000	0.62



**Figure 2. Boxplot of the appearance of the first environmental question by state.**

In Iowa, the environmental question was asked earlier than in New Hampshire, Nevada or Pennsylvania. South Carolina varied.



**Figure 3. Boxplot of the appearance of the first environmental question by moderator.** Russert tended to ask the first environmental question much later than any other moderator.



## Appendix 2. Categorization of Questions by Topics

The definition of questions into the four topic areas of foreign, domestic economic and social, or environmental was a relatively straightforward process (See Table A3). When questions overlapped topic areas, I was forced to make an educated decision that I then repeated consistently in following debates.

### Foreign

The foreign issue area included any discussion of foreign affairs, including the war in Iraq. This topic also included trade issues, and the discussion of NAFTA. These discussions often include military intervention, such as this question from the 7.23.07 SC debate:

Question: I'm Gabriel. And I'm Connie, from a refugee camp near Darfur... what action do you commit to that will get these children back home to a safe Darfur and not letting it be yet another empty promise?

Cooper: Governor Richardson, what are you going to do? Would you commit American troops?

I chose to include immigration in the category of foreign issues, though this could certainly be included in the topic of social policy. This question from the 10.30.07 PA debate to Sen. Clinton gained much media attention.

Russert: Senator Clinton, Governor of New York Eliot Spitzer has proposed giving driver's licenses to illegal immigrants. You told the Nashua, New Hampshire editorial board it makes a lot of sense. Why does it make a lot of sense to give an illegal immigrant a driver's license?

### Economic

The domestic economic category included any discussion of the budget, job loss/creation, taxes and wages. This category often overlapped with the social category, when moderators asked how social programs would be financed. Thus, I limited the economic category to strictly economic discussions, such as this question from the 8.19.07 IA debate:

Stephanopoulos: This is -- this is basically a yes-no question. We've seen all this turmoil in the markets over the last couple of weeks, caused by the credit crunch and the crisis in the mortgage markets. We saw, on Friday, the Federal Reserve lowered the discount rate for banks. Should they lower rates for everyone else, yes or no?

### Social

This topic often included questions about current events, such as this question from the 4.27.07 SC debate:

Williams: Senator Clinton, a question for you: Did the government -- did any role that federal government plays fail those students at Virginia Tech?

Or this example from the 9.26.07 NH debate.

Russert: Senator Obama, you were criticized by Jesse Jackson and others about your -- in their words -- tepid response about the situation in Jena involving civil rights difficulties in Louisiana. Should you have gone to Jena, Louisiana, in order to try to bring those communities together?

I chose to include discussions of military benefits/Walter Reed in the social topic area, though this could arguably be included in foreign policy in its relationship to military policy.

### **Environment**

Environmental questions were the mostly easily identified. These questions included any discussion of energy policy or climate change mitigation, such as this question from the 12.13.07 IA debate:

Washburn: Most of you have laid out plans to move toward energy independence. Those plans have cost attached and potential negative impacts, at least in the short-term. For example, maybe more expensive cars, more expensive feed for livestock, impacts on coal-producing states. So what would you do to turn it into a net benefit for the American economy, and how long might that take? Senator Biden?

Energy policy questions often included the discussion of nuclear power and its subsequent waste, such as this question from the 11.15.07 NV debate:

Roberts: Senator Obama, the price of oil is flirting with the \$100-a-barrel mark right now, making all the more urgent the need for alternate fuel forces. You support nuclear \*energy as a part of the plan for the future, but there is an issue of what to do with the waste. You are opposed to the Yucca Mountain nuclear repository about 90 miles from here. Your state uses about -- gets about 48 percent of its power from nuclear compared to 20 percent for most other states. Yet you are opposed to bringing nuclear waste from other states and keeping it in Illinois. The question is, if not in your backyard, whose?