Environmental disasters as risk regulation catalysts? The role of Bhopal, Chernobyl, Exxon Valdez, Love Canal, and Three Mile Island in shaping U.S. environmental law

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Abstract Unexpected events such as environmental catastrophes capture wide public attention. Soon after five major shocks—Three Mile Island, Love Canal, Bhopal, Chernobyl, and the Exxon Valdez oil spill—Congress voted on new risk regulation. This paper conducts an event study to test whether individual congressional representatives were "shocked" by these environmental disasters into increasing their probability of voting in favor of risk legislation. On average, representatives were less likely to vote in favor of bills tied to these five events. Significant heterogeneity in representatives' responses to these shocks is documented. Liberal Northeast representatives were most likely to increase their pro-environment voting in the aftermath of these shocks.

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Unexpected events such as environmental catastrophes capture wide public attention. Soon after such shocks, new regulation is often enacted. For example, the 1969 fire on the Cuyahoga River in Cleveland began when sparks from a train ignited debris that was floating in a slick of oil and chemicals. Three years after this fire, the Clean Water Act was passed.

Do such events *cause* new regulation? Such environmental shocks often have a catalytic effect of generating massive media coverage that galvanizes the public.[1] Kuran and Sunstein (1999) provide a compelling case study of the media "snowball"

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[1] In discussing the aftermath of the Union Carbide disaster in Bhopal, India, Lazarus (2004) writes: "The impetus for the renewed legislative attention was, as is often the case for environmental law, an environmental accident with tragic consequences." (p. 111).

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surrounding toxic waste dumped at Love Canal and the resultant Superfund legislation:

> A kind of cascade effect occurred, and hence in the period between August and October, 1978, the national news was saturated with stories of the risks to citizens near Love Canal. The publicity continued in 1979 and 1980, the crucial years for Superfund's enactment. There can be no doubt that the Love Canal publicity was pivotal to the law's passage in 1980. In that year, *Time* magazine made the topic a cover story, and network documentaries followed suit. Polls showed that eighty percent of Americans favored prompt federal action to identify and clean up potentially hazardous abandoned waste sites. Congress responded quickly with the new statute. (Kuran and Sunstein 1999)

> Oil spill liability law offers another example of the power of shocking events.

> For many of the 15 years that Congress spent laboring in vain to produce a national oil-spill liability law, some frustrated backers predicted it would take a catastrophic oil spill to break the legislative stalemate. In 1989 that catastrophe happened. The largest spill in U.S. history occurred March 24 when the Exxon Valdez dumped more than 10 million gallons of oil into Alaska's Prince William Sound. It took a disaster of that magnitude to get both chambers to pass bills that set up a national program to parcel out financial responsibility for oil spills and to pay for cleanup and damages. The two chambers had been deadlocked over such a plan since 1975. (1989 *Congressional Quarterly*, p. 682)

Stoked by active media coverage, such disasters may shift the balance of power between environmentalist interest groups seeking new regulations and tightly organized business interests. The typical voter has little incentive to invest time in being well informed about low probability events. Salient events may change this equilibrium. A crisis can act as an early warning, drawing attention to an issue that people had not previously considered (Kurtz 2004). These shocks may cause people to now fear for their own safety (Viscusi and Zeckhauser 2006). The "normative analysis as a positive theory" of regulation would predict that voters would demand new regulation to address the apparent externality exposed by the recent disaster (Peltzman 1999; Keohane, Revesz and Stavins 1998). If voters are incensed by such disasters, then their congressional representatives may respond by holding hearings and enacting new risk legislation (Noll and Krier 1990). Polluting firms, such as Exxon or Union Carbide, may fear that their long run reputation will be hurt by the shock (Karpoff, Lott and Wehrly 2005). Such firms may be more willing to accept new regulations. Disasters create reputation externalities affecting all firms within the industry. The Chernobyl accident damned all nuclear plants (Zeckhauser 1996).

This paper seeks to test this catalyst hypothesis by focusing on five well known environmental shocks: Three Mile Island, Love Canal, Bhopal, Chernobyl, and the Exxon Valdez oil spill. I first document that these events received extensive media attention. Using a representative level panel data set over the years 1973 to 2002, this paper examines voting patterns on environmental legislation before and after the five events. This paper's empirical contribution is to conduct an event study to test whether individual representatives are "shocked" by these environmental disasters into increasing their probability of voting in favor of risk legislation.

The fundamental empirical challenge is to construct credible counter-factuals for congressional environmental voting patterns. My empirical approach relies on the panel nature of my data set. I observe the same congressional representative voting in years when disasters did and did not occur. Thus, I can control for representative and calendar year fixed effects. In years when an environmental disaster occurs, such as 1989 with the Exxon Valdez spill, I observe the representative's voting patterns on environmental legislation directly related to the recent environmental disaster and his voting on environmental legislation unrelated to the disaster. This variation allows me to test whether representatives increase their propensity to vote the pro-environment position on legislation directly related to the shock relative to their baseline environmentalism.

This analysis demonstrates that representatives are less likely to vote the pro-environment position on legislation tied to catalytic events. I argue that this counter-intuitive finding is generated by selection in the bill generation process. In the aftermath of catalytic events, representatives with a "greener" historical voting record are more likely to sponsor legislation. Such representatives are likely to propose more ambitious legislation than the average representative.

I document a significant degree of heterogeneity with respect to the catalytic voting effect. Disaggregating by event, I find evidence of a higher propensity to vote pro-environment on legislation tied to the Love Canal and Bhopal events relative to voting propensities on other environmental issues in the same calendar year. I also document significant voting heterogeneity with respect to observable attributes of representatives. Liberal Northeastern Democrats who receive a small share of campaign contributions from corporations are the most likely to increase their propensity to vote pro-green in the aftermath of these environmental disasters.

The final section of the paper investigates how regulatory agency growth is affected by the new legislative mandates enacted in the aftermath of these shocks. In particular, why has Superfund spawned an enormous growth in regulatory activity while increased nuclear regulation in the aftermath of Chernobyl and Three Mile Island has been relatively minor?

This paper builds on previous research that has examined the determinants of congressional voting patterns on major risk legislation. Hird (1993, 1994) studied voting on Superfund, and Hamilton (1997, 2005) studied voting on the Toxic Release Inventory. This paper also builds on previous research that has examined the determinants and timing of when new environmental regulations are adopted. Such factors as per-capita income and pressure group participation have been identified as having a causal role (Seldon and Song 1995; Grossman and Krueger 1995; Fredriksson et al. 2005).

1 Media coverage of five environmental shocks

The five environmental shocks that I study in this paper received extensive media coverage. These events were not simply environmental shocks. Human error helped cause each of these shocks. When "man made" disasters such as nuclear plant accidents, chemical releases or oil spills take place, people often blame "greedy" corporations for negligence. The probability of an industrial disaster is a decreasing function of costly

safety investments by firms (Ehrlich and Becker 1972). If firms such as Exxon could have anticipated the public relations nightmare caused by their oil spill, then such firms would have invested more ex-ante to reduce the likelihood of a spill.[2]

Media coverage is a necessary condition for such events to be regulatory catalysts. A number of recent papers have emphasized the role played by the media in determining economic and political outcomes (Gentzkow and Shapiro 2006; Hamilton 2004; DellaVigna and Kaplan 2006; Eisensee and Stromberg 2007; Mullainathan and Shleifer 2005; Besley and Burgess 2002).

Appendix A provides details about five major environmental shocks that took place between 1978 and 1989.[3] The *New York Times* historical search engine provides a consistent method for counting news coverage of each of these shocks. In Figure 1, I graph story counts from the *New York Times* mentioning "oil spills," "nuclear accidents," and "hazardous waste" over the years 1971 to 1998. The figure highlights that Love Canal, Three Mile Island, Chernobyl and the Exxon Valdez shock all had large effects on shifting the composition of news coverage. In the aftermath of the Exxon Valdez spill, there was a disproportionately high quantity of media coverage relative to the number of gallons of oil spilled.[4] These facts support Zeckhauser's (1996) claim that concentrated losses are substantially overweighted by the public relative to other day to day threats to health and well being where the costs are dispersed and it is difficult to identify the key polluter (i.e health damage from coal fired power plants).

In the aftermath of the environmental disasters, media attention does decay over time. To document this, I report a monthly count of articles in the newspaper for the 36 months after the shock.[5] Figure 2 presents these time series figures documenting media coverage. The count of articles devoted to the environmental disaster declines to zero three years after the event.[6]

Stoked by ample media coverage, disasters may shift the balance of power between interest groups. A standard pressure group theory would posit that tightly organized producer groups would have success fending off the demand for

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[2] Researchers have investigated the circumstances when corporations will "green" themselves (see Lyon and Maxwell 2004).

[3] For a detailed account of the Bhopal shock see Fischer (1996).

[4] I used the *New York Times* search engine to count all mentions of "oil spills" each year from 1969 to 2003. Data on major oil spills are available from http://www.endgame.org/oilspills.htm. Using this data, I estimated the following OLS regression: annual count of oil spill media mentions=109.57+13.12×log(1+total gallons spilled in major spills)+307.78×(Post-Exxon Valdez)−2.28×Trend. Post-Exxon Valdez is a dummy variable that equals one if the year equals 1989, 1990 or 1991. This regression indicates that controlling for annual spillage in major accidents, the *New York Times* published 308 extra articles per year mentioning "oil spills" in the immediate post-Exxon Valdez years relative to other years.

[5] *New York Times* articles were counted in month increments following the environmental shock. The articles were found using the *New York Times* historical online archive. Keyword searches were used to find the different environmental shocks. Time intervals were in months starting with the day the shock occurred.

[6] Using television news coverage data from The Database of the Vanderbilt Television News Archive (see http://tvnews.vanderbilt.edu/displayindex.pl), I found a very high positive correlation (over 0.7) between the monthly count of evening television news mentions and *New York Times* coverage. The Vanderbilt Archive can be searched by keyword for the contents of evening news broadcasts on major networks (ABC, CBS, NBC) since 1968.
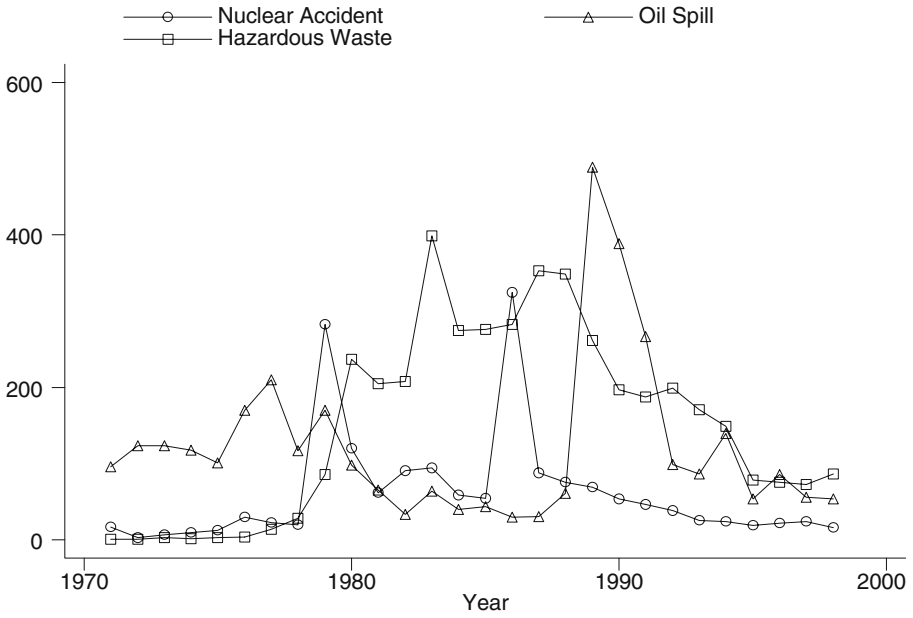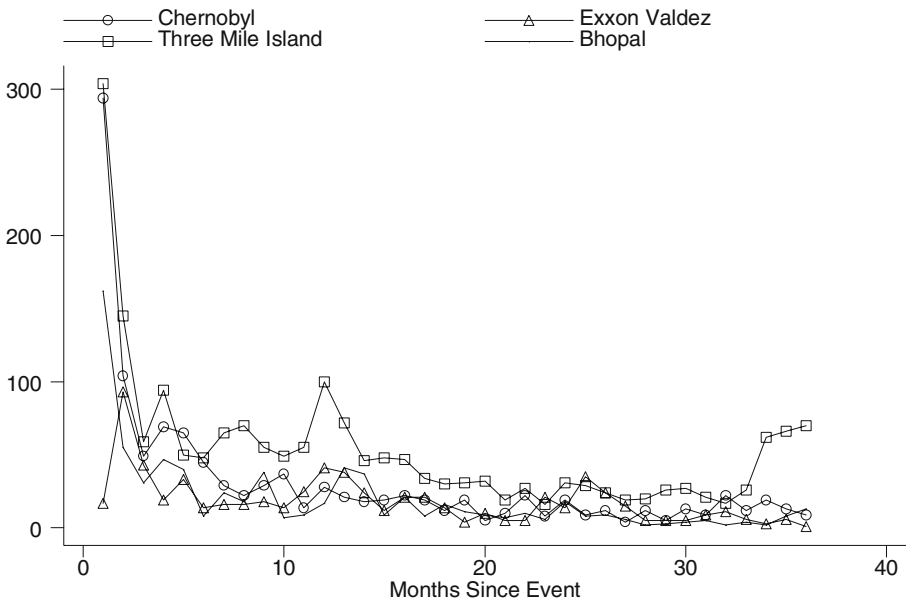
Fig. 1 New York Times event coverage

Fig. 2 New York Times coverage of four shocks

environmental regulation against diffused, free riding voters. The typical voter has little incentive to invest time in being well informed about low probability events. Salient events may change this equilibrium.

Such media coverage can encourage the Congress to take action. When the media are actively covering a news story, this reduces the cost for people to learn about the issue.[7] For low probability rare events such as chemical spills or accidents at nuclear plants, people may never have thought about the particular risk before. Big shocks can "educate" the rationally ignorant voter, leading to pressure for legislative or regulatory reform (Kane 1996; Sunstein 2003).[8] This catalytic effect would be even larger if people believe in a "law of small numbers" (Noll and Krier 1990; Rabin 2002). People tend to overestimate low probability events and highly publicized events (Viscusi and Hamilton 1999). For low probability events such as nuclear accidents, chemical releases and oil spills, voters and congressional representatives might observe the new shock and increase their posterior probability assessment of the likelihood of future shocks.

This paper focuses on the consequences of five shocks that became national media sensations. I do not attempt to offer an explanation for why these events "snowballed." There have been other environmental shocks that received relatively little media coverage, such as the 1986 chemical spill in Basel, Switzerland that created a massive fish kill in the Rhine River.

2 Congressional voting patterns on "pre and post" shock legislation

This section examines the environmental voting records of individual members of the US House of Representatives between 1973 and 2002. My goal is to use an event study framework to test whether catalytic events *shock* Congress. Do the same representatives vote differently on relevant environmental legislation shortly after a catalytic event?

My empirical strategy exploits the panel nature of my data set. I observe the same congressional representative voting on different types of environmental legislation in different years. The unit of analysis is a representative's vote on a specific bill. In any given year, each representative votes on multiple bills. Some of these bills will be related to legislation tied to one of the five salient events and other bills will have no link. I estimate linear probability models of the form:

$$\text{Prob}\left(\text{Pro Environment}_{ilt} = 1\right) = \Phi_i + \Phi_t + B_1 \times 1(\text{Catalytic Bill}_{ilt}) + B_2$$

$$\times X_{ilt} + U_{ilt} \qquad (1)$$

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[7] "You may read the article because you feel a duty to stay informed as a citizen and voter. You may simply enjoy reading about the politics of the environment. The knowledge in this case is simply fun and any impact on your future voting decision is a by product of your intrinsic desire to know what's happening." (Hamilton 2004, p. 241).

[8] Public opinion polls that measure attitudes toward the building of nuclear power plants in the United States document that nuclear disasters do influence public opinions (Rosa and Dunlap 1994). The month before the Three Mile Island accident, 57% of respondents favored building more nuclear power plants. One month after Three Mile Island, this favorable percentage declined to 46% while the percentage opposing new power plant construction increased to 45%, from 30% 1 month before.

In these regressions, the dependent variable is a dummy variable, Pro Environment$_{ilt}$ equals 1 if Representative i votes the pro-environment position on ballot l in year t. In the next section, I describe how I partition congressional votes into "pro-environment" and "anti-environment" votes. This framework allows me to control for individual representative fixed effect, Φ_i, and calendar year fixed effects Φ_t.[9] The dummy variable, 1(Catalytic Bill), equals one if the bill in question is one of the fifteen listed in Appendix B. These fifteen bills represent the pieces of legislation that the League of Conservation Voters identified as important votes taking place shortly after the five shocks. The standard errors are adjusted to account for representative/year clustering.

This regression framework allows me to test whether representatives are more likely to vote pro-environment on Catalytic Bills (i.e $B_1 > 0$) relative to their voting patterns on non-catalytic bills in the same calendar year. Below, I refer to estimates of B_1 as the catalytic effect.[10] By interacting the Catalytic Bill dummy with a number of explanatory variables I test a variety of hypotheses concerning heterogeneous effects induced by environmental shocks. I provide specifics about these hypotheses in the next section after I discuss my data sources.

2.1 Data sources

I rely on the annual League of Conservation Voters' (LCV) "scorecard" to determine which roll call votes are important pieces of environmental legislation and to identify what is the "pro-environment" vote on each specific issue:[11]

> This Scorecard represents the consensus of experts from 19 respected environmental and conservation organizations who selected the key votes on which members of Congress should be graded. LCV scores votes on the most important issues of the year, including environmental health and safety protections, resource conservation, and spending for environmental programs....Except in rare circumstances, the Scorecard excludes consensus action on the environment and issues on which no recorded votes occurred. Dedicated

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[9] The representative fixed effect will capture the representative's own ideology and will reflect the time invariant attributes of his constituents' preferences for environmental protection (Peltzman 1984).

[10] I face a challenge of defining the "window" over which to define a "Catalytic Bill." For example, the Love Canal event triggered extensive national media attention in 1978. Are Superfund bills voted on in 1984 and 1985 "Catalytic Bills"? My goal is to measure the immediate impact of shocks on representatives' behavior. With a wider window, representatives may learn about the "pork benefits" of voting for Superfund. In the empirical work, I choose to narrow the window of opportunity and define catalytic bills as those that occur soon after the environmental shock. Figure 2 does highlight that media coverage of broad event categories quickly converges back to the baseline a couple of years after the shock occurs.

[11] Other researchers who have used LCV data include Nelson (2002), Hamilton (2005), and Gershtenson, Smith and Mangun (2006). Nelson (2002) uses LCV data from 1988 to 1998 to evaluate the roles of ideology, constituency, and political party for roll-call voting in the US Senate on a broad set of environmental issues. His data cover 91 senators for 130 roll-call votes. The study decomposes the scale-adjusted scores into relative weights due to the general electorate, the senator's support constituency, party leadership, and ideology. The main findings are that a senator's ideology is by far the most important consideration for voting profiles on environmental issues, and that party affiliation and regional loyalty explain about 74% of measured ideology.

environmentalists and national leaders volunteered their time to identify and research crucial votes. (www.lcv.org)

My data set includes each representative's vote on 380 different pieces of environmental legislation. If a representative served from 1973 to 2002, then I would have 380 observations for this person.[12] Keith Poole's Voteview data provides information on how each representative voted on each of these bills.

It is important to note that the LCV data base excludes some House votes on environmental issues. Appendix C provides an example by listing all legislation tied to the Exxon Valdez oil spill. Over the course of 1 day, Congress voted on eight different pieces of legislation. Most of these votes were close. In the end, the House voted by 375 to 5 to pass HR 1465 to set limits on liability and damages caused by oil spills and to establish a fund to help pay for those damages.[13]

For each of these 380 pieces of legislation, I have studied the details of each bill and have identified the subset of fifteen bills that the House voted on in the aftermath of the five environmental disasters. For the remainder of this paper, I will refer to these bills as the *Catalytic Bills*. Details about each of these bills are provided in Appendix B.

In Figure 3, the unit of analysis is a bill. I graph the share of pro-environment votes on each bill with respect to the calendar year. The figure highlights the time trends and the dispersion of votes within each calendar year. As a whole, the Congress's propensity to vote pro-green increases until 1989 and then slightly decreases in the 1990s.

In estimating Eq. 1, I always include representative and calendar year fixed effects. To control for a representative's overall political perspective, the regression specifications always include the Poole and Rosenthal (1997) measures of political ideology.[14] This measure varies by representative and by Congress.

To test for whether B_1 in Eq. 1 varies as a function of representative attributes, I use data on representative campaign contributions from the Federal Election Commission (see ftp://ftp.fec.gov/FEC/). I was able to merge data from the FEC data base to the Voteview data base for 53% of the representatives. For each of these representatives, I calculate his average share of campaign contributions during the 1980s that were from corporations. Below, I report estimates where I interact this variable with the Catalytic Bill dummy. I also use Census and Regional Economic Information System data to identify states where the 1980 share of college graduates

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[12] The LCV webpage does not report House of Representatives data for the years 1977 and 1978.

[13] An examination of congressional activity in the aftermath of disasters reveals lopsided votes. After Three Mile Island, the House voted to amend H.R. 4388 by increasing by $5 million the appropriation to the Nuclear Regulatory Commission for its on site inspector training program. This passed by a vote of 350 to 10. The LCV does not include this bill as one of the key environmental votes in 1979.

[14] My measure of representative ideology is the Poole and Rosenthal two factors (see http://voteview.com/dwnomin.htm). They conduct a principal-components factor analysis of congressional voting patterns to assign each representative in each Congress a point in a two dimensional ideology space. In the political science literature, this is the most commonly used measure of legislator preference. It is important to note that Poole and Rosenthal (1997) use all congressional roll call votes, not simply the environmental votes, to create their indices. They interpret the first dimension as measuring whether a legislator is a liberal or a conservative.
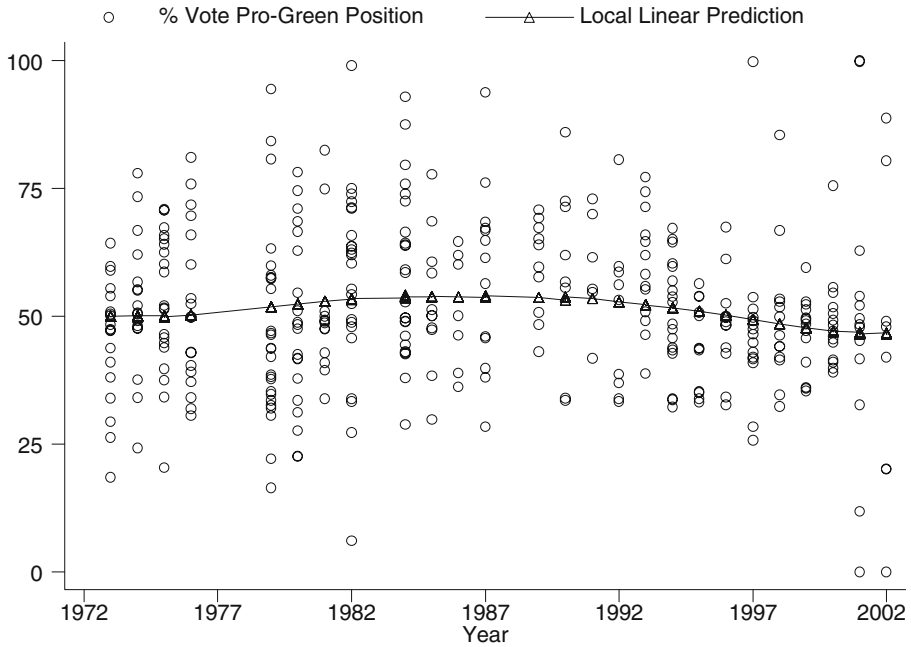
Fig. 3 Trends in pro-environment voting by the house of representatives across 380 bills

is greater than the state median and states where the 1980 share working in manufacturing is greater than the state median.

2.2 Estimates of the average disaster effects on voting and absenteeism

In Table 1, I report three estimates of Eq. 1 using the representative panel data set. Controlling for representative fixed effects, year fixed effects, and overall representative political ideology, I report estimates of B_1. If all representatives voted on each bill then there would be over 165,000 observations (435 representatives voting on 380 different bills). In specification (1), the interpretation of the first average "treatment effect" estimate is that catalytic events *reduce* the probability that a representative votes pro-green by 5.4 percentage points relative to pro-green environmental voting on non-catalytic environmental issues in the same calendar year.[15] In the next section, I will argue that bill selection in the aftermath of disasters might explain this counter-intuitive result.

Representatives concerned about not angering their constituents may choose not to vote on high profile catalytic legislation. There are likely to be representatives who oppose more stringent regulation of industry but do not want to provide campaign fodder for opponents in the next election campaign by voting anti-

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[15] This finding is robust to trimming the sample and only examining voting patterns on legislation voted on between 1977 and 1993. Recall that all five of the shocks took place between 1978 and 1989.

Table 1 Representative environmental voting patterns

Column	(1) Vote pro-green	(2) Does not vote	(3) Vote pro-green
Catalytic roll call	−0.0543 (0.0071)	0.0208 (0.0046)	−0.0623 (0.0071)
Catalytic roll call × ideology factor #1			−0.1580 (0.0152)
Constant	0.4990 (0.0070)	0.0159 (0.0091)	0.4995 (0.0070)
Representative fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Poole-Rosenthal overall ideology indicators	Yes	Yes	Yes
Observations	153,804	167,698	153,804
Adjusted R^2	0.315	0.115	0.315

This table reports three estimates of Eq. 1 in the text. In column (2) the dependent variable is a dummy that equals 1 if the representative did not vote on a piece of legislation. The omitted category is a roll call not listed in Appendix B. The standard errors, reported in parentheses, are clustered by representative/year.

environment on legislation when citizens are "watching." In Table 1, column (2), the dependent variable is a dummy variable that equals one if the representative did not vote on a piece of legislation. Controlling for representative fixed effects, issue fixed effects and year fixed effects, the probability that a representative does not cast a vote on a catalytic bill is 2.1 percentage points higher than the probability that a representative does not cast a vote on a non-catalytic bill. Relative to the mean absence rate of 9.8%, this effect is large.

2.3 Is more stringent regulation proposed after disasters?

One plausible explanation for this unexpected negative coefficient estimates of B_1 reported in Table 1 is that political entrepreneurs attempt to capitalize on the shocks to propose more radical legislation. This would introduce a selection effect such that greener legislation is voted on during catalytic periods.

One indicator of congressional attention to specific issues is the count of congressional hearings. The Congressional Universe Database is used to count the number of hearings by category by Congress. In Table 2, I report the count of hearings over the years 1969 to 1998 for the categories "nuclear accident," "oil spill" and "hazardous waste." There is clear evidence of sharp increases in congressional activity for these specific topics in years when disasters have taken place (Kurtz 2004). For example, hearings related to nuclear accidents spike in 1979 (Three Mile Island) and 1986 (Chernobyl). I also examine how congressional hearing mentions of the five specific events change over time. In Table 2, I show that Congress holds many hearings mentioning the shock immediately after each shock takes place but a sharp decay pattern is observed. For example, during the 96th Congress there were 52 mentions of Three Mile Island in congressional hearings but by the 100th Congress there were only three mentions of this event.

While it is quite difficult to rank bills with respect to their "stringency," I can use information on the environmental voting record of each bill's sponsor to test if

Table 2 Count of House and Senate hearings that mention each topic

Congress	Year	Oil spill	Hazardous waste	Nuclear accidents	Love Canal	Bhopal	Exxon Valdez	Chernoybl	TMI
91	1969–1970	24	0	4					
92	1971–1972	17	0	0					
93	1973–1974	27	4	9					
94	1975–1976	14	5	41					
95	1977–1978	38	6	56					
96	1979–1980	33	45	92					52
97	1981–1982	9	38	55	10				31
98	1983–1984	11	68	49	2	3			17
99	1985–1986	9	61	66	0	2		13	7
100	1987–1988	10	82	69	1	0		8	3
101	1989–1990	59	78	47	0	0	26	0	
102	1991–1992	27	76	35		0	6	2	
103	1993–1994	15	65	24			1	2	
104	1995–1996	10	41	21			0		
105	1997–1998	8	36	18			1		

"greener" representatives sponsor post-shock legislation. For 225 bills voted on between 1973 and 1998 that the LCV has tagged as important, I know the name of the representative who sponsored the legislation.[16] For each of these representatives, I calculate his/her overall average share of pro-environment votes over the years 1973 to 2002. I regress this measure of average environmentalism on a dummy variable indicating whether a specific roll call was on a catalytic bill (see Appendix B). For the 225 bills, an OLS regression that includes year fixed effects yields:

$$Sponsor\ Pro - Green\ Score = .569 + .158 * 1(Catalytic\ Bill).(.019)(.081)$$

The average sponsor of a piece of non-catalytic legislation votes the pro-environment position 56.9% of the time while the average sponsor of a catalytic piece of legislation votes the pro-environment position 72.7% of the time.

For the fifteen catalytic bills listed in Appendix B, I calculate the percent of congressional representatives who voted "pro-environment" on each of these. This is graphed on the vertical axis in Figure 4. On the horizontal axis, for each of the fifteen bills' sponsors, I calculate their overall "pro-environment" voting record over the years 1973 to 2002. The Figure documents a clear negative correlation. Bills proposed by more "pro-green" representatives are less likely to receive a majority of pro-environment votes.

Additional supporting evidence for the selection hypothesis is reported in Figure 5. Figure 5 is similar to Figure 4 but in this case I graph the data for the 225 bills voted

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[16] Keith Poole's data provides the name of the bill sponsor for 225 of the 380 bills.
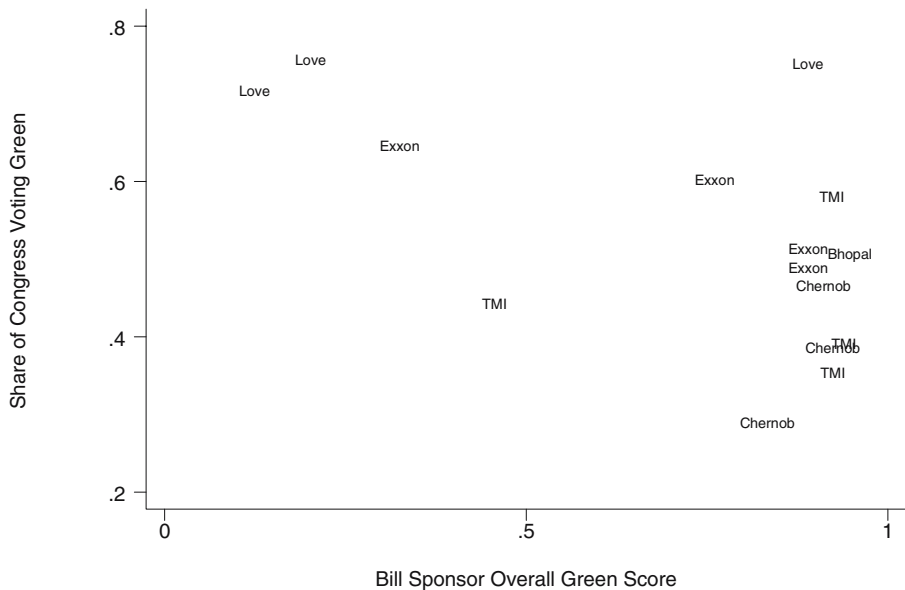
Fig. 4 Explaining variation in pro-green votes on catalytic bills

on between 1973 and 1998.[17] There is a negative correlation between a bill sponsor's
"greenness" and the share of pro-environment votes received by the roll call.[18]

   In Table 3, I document how such sponsor selection affects observed estimates of
B_1 in Eq. 1. This table is identical to Table 1 except that I only focus on
representatives' votes over the years 1973 to 1998. As shown in column (1), I
recover an estimate of B_1 equal to −0.033. In column (2), I control for the legislative
bill's sponsor share of pro-environment votes between the years 1973 and 2002. For
example, a "green" representative might have an overall pro-environment voting
record equal to 0.75. This would indicate that the representative votes the LCV's
position on 75% of congressional bills. Note that this variable has a negative and
highly statistically significant coefficient. When environmentalists in the Congress
propose legislation, the legislation receives a smaller share of pro-environmental
legislation in the House. Including this variable shrinks the coefficient estimate of B_1
down to a statistically insignificant −0.0072. While I cannot observe each bill's
"stringency," an intuitive interpretation of these findings is that in the aftermath of
environmental shocks, environmentalists in the Congress sponsor more ambitious

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[17] Keith Poole's Voteview data does not provide the bill sponsor's name starting in the 106th Congress. The
Voteview data does not provide multiple bill sponsor names.

[18] Quotes presented in the 1989 *Congressional Quarterly* (see p. 686) highlight that the emotionally charged
Congress was spurred on in the aftermath of the Exxon Valdez spill to vote on tougher oil-spill regulation.
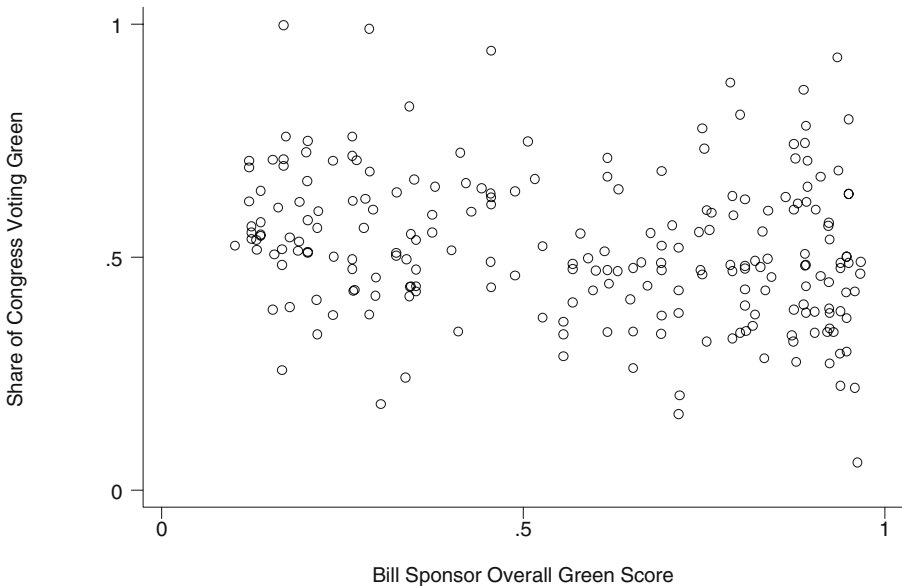
Fig. 5 House environmental voting outcomes from 1973 to 1998

legislation in hopes that the Congress's environmental preferences have shifted greener due to concern generated by the shock.

2.4 Testing for differential effects across the five environmental shocks

The results in Table 1 implicitly assume that Three Mile Island, Love Canal, Bhopal, Chernobyl and the Exxon Valdez oil spill each has the same effect on representative

Table 3 Environmental roll call outcomes as a function of bill sponsor characteristics

Column	(1)		(2)	
	Beta	SE	Beta	SE
Catalytic roll call	−0.0333	0.0070	−0.0072	0.0069
Sponsor's overall pro-green voting record			−0.1505	0.0060
Constant	0.4913	0.0070	0.5759	0.0078
Representative fixed effects	Yes		Yes	
Year fixed effects	Yes		Yes	
Poole-Rosenthal overall ideology indicators	Yes		Yes	
Observations	88,957		88,957	
Adjusted R^2	0.298		0.304	

This table reports two estimates of Eq. 1 in the text. The omitted category is a roll call not listed in Appendix B. Sponsor's overall pro-green voting record is a variable that takes on the values 0 to 1. It represents the bill sponsor's percentage of pro-environment votes on all environmental legislation voted on between 1973 and 2002. The data set includes those votes over the years 1973 to 1998 in which the bill sponsor is identified in the Voteview database. The standard errors are clustered by representative/year.

voting. In Table 4, I relax this assumption. Table 4 reports nine estimates of Eq. 1 where I allow each shock to have its own effect. As shown in column (1), there is significant variation in the *treatment effect* by event type. Relative to other environmental legislation in the same calendar year, representatives were 15.1 percentage points more likely to vote pro-environment on Love Canal related legislation while representatives were 27 percentage points less likely to vote the pro-environmental position on Chernobyl legislation relative to their propensity to vote pro-environment on non-catalytic legislation in the same calendar year.[19] Across the five shocks, the largest negative estimates of B_1 are for legislation related to Chernobyl and the Exxon Valdez. As shown in Appendix C, for three of the four catalytic bills related to the Exxon Valdez, the pro-environment position received the majority of the votes.

Nuclear liability legislation offers one direct test of whether the two nuclear shocks (Three Mile Island and Chernobyl) shocked the Congress into increasing its pro-environmental voting. In this case, the Congress voted on similar legislation at two points in time with one vote taking place before either of the two nuclear disasters. On December 8, 1975, the Congress voted to amend HR 8631, a bill revising the method of providing for public remuneration in the event of a nuclear incident by eliminating the $560 million limitation of liability and requiring the industry to carry full protection for losses. This bill lost by a vote of 176 to 217. This vote, which would have raised the 1957 Price-Anderson liability caps, took place before both the Three Mile Island and the Chernobyl shocks. After both of these shocks, the Congress voted again on July 29, 1987 to raise the Price-Anderson liability caps (see Appendix B, event no. 9). There were 129 representatives who voted on both pieces of legislation in 1975 (before) and 1987 (after). Of these 129 representatives, 65 voted against both pieces of legislation and 35 voted in favor of both pieces of legislation. Twenty-five members of Congress who voted in favor of raising the liability caps *before* the environmental shocks voted against raising the caps in 1987. There were only five representatives who voted against the 1975 legislation and then voted in favor of the 1987 legislation.

2.5 Evidence of heterogeneous responses across representatives

This section documents that the catalytic effect, see B_1 in Eq. 1, varies markedly with respect to observable attributes of representatives. Table 1, column (3) provides a first test of this hypothesis. In this equation, I include an interaction term between a representative's overall political ideology and whether the bill being voted on is one of the fifteen catalytic bills. Recall that the Poole and Rosenthal (1997) ideology measure is constructed using information on *all* of the representative's votes over the course of a congressional term. As shown in column (3), liberal representatives are more likely to vote in favor of pro-green catalytic bills while conservative representatives (who have a positive Ideology Factor Score) are less likely to vote

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[19] Recall that B_1 in Eq. 1 is estimated by calculating E(vote pro-environment | Year T and Catalytic Vote)$-E$(vote pro-environment | Year T and non-catalytic vote).

Table 4 Representative environmental voting patterns stratified by attributes

Column	(1) All	(2) Northeast	(3) Midwest	(4) South	(5) West	(6) Democrat	(7) Republican	(8) High Education States	(9) High manufacturing states
Three Mile Island roll call votes	-0.0510	0.0116	-0.0457	-0.0879	-0.0813	-0.0236	-0.0976	-0.0602	-0.0433
	(0.0122)	(0.0288)	(0.0218)	(0.0187)	(0.0302)	(0.0159)	(0.0182)	(0.0167)	(0.0159)
Love Canal Roll Call Votes	0.1513	0.2207	0.1525	0.1067	0.1306	0.1802	0.1114	0.1245	0.1821
	(0.0121)	(0.0196)	(0.0231)	(0.0246)	(0.0253)	(0.0135)	(0.0216)	(0.0155)	(0.0151)
Bhopal Roll Call Votes	-0.0299	0.2084	-0.0534	-0.1529	-0.0618	0.0647	-0.1606	0.0139	0.0107
	(0.0187)	(0.0338)	(0.0365)	(0.0319)	(0.0375)	(0.0255)	(0.0239)	(0.0246)	(0.0254)
Chernobyl Roll Call Votes	-0.2698	-0.2429	-0.1966	-0.4138	-0.1609	-0.1970	-0.3747	-0.2155	-0.2712
	(0.0159)	(0.0414)	(0.0296)	(0.0223)	(0.0286)	(0.0217)	(0.0204)	(0.0220)	(0.0225)
Exxon Valdez roll call votes	-0.0604	-0.0196	-0.0740	-0.1598	0.0824	-0.0521	-0.0721	-0.0242	-0.0736
	(0.0164)	(0.0317)	(0.0302)	(0.0305)	(0.0340)	(0.0217)	(0.0249)	(0.0225)	(0.0216)
Constant	0.4989	0.5278	0.5532	0.3784	0.5230	0.5515	0.4396	0.5284	0.5138
	(0.0070)	(0.0262)	(0.0133)	(0.0194)	(0.0160)	(0.0186)	(0.0274)	(0.0105)	(0.0096)
Representative fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Poole-Rosenthal overall ideology indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	153,804	34,177	41,342	49,574	28,596	86,818	66,986	80,228	89,223
Adjusted R^2	0.316	0.244	0.305	0.244	0.390	0.227	0.198	0.350	0.296

This table reports nine estimates of Eq. 1 in the text. The omitted category is a roll call not listed in Appendix B. Democrat represents the subset of representatives who are Democrats. Republican represents the subset of representatives who are Republicans. High education states are the states whose 1980 percent of college graduates is greater than the median state's share of college graduates. High manufacturing states are the states whose 1980 percent of total employment in manufacturing is greater than the median state's share of manufacturing jobs. The standard errors are clustered by representative/year.

in favor of such bills. This suggests that environmental disasters have a polarizing effect on how Congress votes on subsequent legislation.[20]

To further study the heterogeneity hypothesis, in Table 4 I report estimates of Eq. 1 stratified along a number of dimensions. In columns (2–5), I report separate estimates by geographical region. As shown in column (2), the Northeast's representatives were galvanized to increase their propensity to vote pro-green on both Love Canal and Bhopal related legislation.[21] Southern representatives, with the exception of pro-green voting on Love Canal, consistently vote against catalytic legislation [see column (4)]. Columns (6) and (7) highlight the differences in voting patterns for Democrats and Republicans. Note that the constant for Democrats is eleven percentage points higher than the Republican's constant. Perhaps surprisingly, with the exception of voting on Bhopal related legislation, representatives from the two parties respond roughly equally to the disasters. With respect to Bhopal, Democrats are 6.5 percentage points more likely to vote pro-environment on directly related legislation while Republicans are 16.1 percentage points less likely to vote pro-green on such legislation.

The final two columns of Table 4 examine the voting behavior of states whose college graduation rates are greater than the state median and states whose manufacturing share of employment is greater than the state median. Comparing column (8) to column (1), I find little difference in the voting behavior of representatives from highly educated states relative to the average state. Similarly, manufacturing states' voting patterns are quite similar to the national average with the exception of voting on Love Canal related legislation. Manufacturing states' representatives are more likely to support Superfund legislation than the average representative.

A second dimension that representatives differ with respect to is the share of their campaign contributions from corporations. In the aftermath of a shock such as the Exxon Valdez spill, affected firms are unlikely to be passive players in the face of new potential regulation (Bonardi and Keim 2005). Such companies are likely to lobby friendly congressional representatives and engage in a public relations campaign to try to shape public opinion and prevent stringent regulation.[22]

In Table 5, I test for whether representatives who collect few campaign contributions from corporations are more likely to increase their pro-environment voting after shocks. To test this I first report estimates of Eq. 1 for this subsample of representatives whom I could merge on FEC data on campaign contributions. The overall estimate of B_1 reported in Table 5, column (1) is quite similar to the complete sample estimate reported in Table 1, column (1). In Table 5, column (2), I include an

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[20] This finding is consistent with evidence presented by Krupnikov et al. (2006). They find that increasing information about the estate tax or politics in general has very different effects on Republicans and Democrats. While Republicans support the repeal of the estate tax, Democratic support is higher among those who know less about the issue. In my setting, the shock reduces the cost of acquiring information about the status quo and representatives respond differently to this new information.

[21] Given this region's high population density and large number of older noxious industrial sites, such voting is consistent with Pashigian's (1985) self-interest hypothesis.

[22] See http://www.exxonmobil.com/corporate/Newsroom/NewsReleases/Corp_NR_Changes.asp for official statements by ExxonMobil regarding their efforts to improve oil-spill prevention.

Table 5 Environmental voting patterns as a function of representative attributes

Column	(1)		(2)		(3)		(4)	
	Vote pro-green		Vote pro-green		Vote pro-green		Vote pro-green	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Catalytic vote	−0.0547	0.0073	0.0568	0.0129				
Catalytic vote × (share of campaign contributions from business)			−0.7468	0.0770				
Three Mile Island roll call votes					−0.0461	0.0129	0.0853	0.0237
(Three Mile Island vote) × (share of campaign contributions from business)							−0.9041	0.1431
Love Canal roll call votes					0.1535	0.0122	0.1606	0.0226
(Love Canal vote) × (share of campaign contributions from business)							−0.0473	0.1484
Bhopal roll call votes					−0.0332	0.0188	0.1612	0.0343
(Bhopal vote) × (share of campaign contributions from business)							−1.2629	0.1868
Chernobyl roll call votes					−0.2690	0.0160	−0.1241	0.0297
(Chernobyl vote) × (share of campaign contributions from business)							−0.9436	0.1473
Exxon Valdez roll call votes					−0.0647	0.0165	0.0389	0.0264
(Exxon Valdez vote) × (share of campaign contributions from business)							−0.6938	0.1597
Constant	0.5062	0.0105	0.5058	0.0106	0.5062	0.0105	0.5058	0.0106
Representative fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
Poole-Rosenthal overall ideology indicators	Yes		Yes		Yes		Yes	
Observations	103,647		103,647		103,647		103,647	
Adjusted R^2	0.3		0.31		0.31		0.31	

This table reports four estimates of Eq. 1 in the text. The omitted category is a roll call not listed in Appendix B. Share of campaign contributions from business has a mean of .149 and a standard deviation of 0.085. The standard errors are clustered by representative/year.

interaction term that equals the catalytic bill dummy multiplied by the share of campaign contributions from corporations. Consider a representative who receives no contributions from corporations. This representative is 5.7 percentage points more likely to vote pro-environment on a catalytic bill relative to non-catalytic bills in the same calendar year. A 10 percentage point increase in the share of campaign contributions from corporations reduces the probability that this representative votes pro-environment on the catalytic bills by 7.5 percentage points. This appears to be a large effect. Column (4) disaggregates and allows the estimate of B_1 to vary by shock. Note again that representatives who receive no corporate contributions all have positive estimates of B_1. I find the largest negative effects of corporate campaign

contributions on the propensity to vote pro-environment on catalytic legislation on the Three Mile Island vote, the Bhopal vote, and the Chernobyl votes.[23]

In estimating the regressions reported in Table 5, I have implicitly assumed that campaign contributions are an exogenous variable. In their study of NAFTA voting patterns, Baldwin and Magee (2000) argue that a representative's contributions from business and labor interest groups are endogenous. Representatives who have a track record of voting for free trade agreements are more likely to receive more money from business interest groups. It is important to emphasize that my econometric specifications include representative fixed effects. These fixed effects capture the overall impact of corporate contributions on average pro-environment voting. I have focused on the role of overall average corporate contributions on voting on salient bills relative to all other bills.[24]

3 Regulatory growth in the aftermath of environmental shocks

The results reported in Table 4 show that Love Canal stands out among the five shocks as the event associated with the largest increase in pro-environmental votes. Soon after Love Canal, Congress enacted Superfund legislation. Superfund has been an enormous regulatory program. The EPA has spent approximately $30 billion dollars by the year 2000 on cleaning up 1,500 hazardous waste sites (Greenstone and Gallagher 2005; Dower 1990). In contrast, the other regulatory programs, introduced due to legislation related to the other four shocks, have been relatively minor.

A plausible explanation for why Superfund dwarfs the other post-shock regulatory programs is the sheer number of potential cleanup sites. The GAO has claimed that the number of these sites could be between 130,000 and 425,000 (Dower 1990). "Even today, one in four Americans live within 3 miles of a Superfund site. Each year, Superfund assesses potentially hazardous waste sites and finds previously unknown chemicals and wastes that require research and new technologies to properly address potential threats to human health and the environment" (http://www.epa.gov/superfund/action/20years/texttl.htm). For each of these abandoned sites, the EPA must determine whether the site is a national priority and then devote resources to cleaning up the site. Since these industrial sites have been abandoned, the EPA cannot use incentives to achieve environmental goals because there is no active economic agent who can be incentivized.[25]

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[23] Throughout this study, I have not explicitly modeled the count of bills proposed or how they are sequenced. A strategic environmentalist in the Congress might play a sequential game such that he proposes aggressive legislation after a shock. If this bill does not pass, he then proposes a less aggressive bill and so on. My econometric approach would recover the voting differential (i.e. B_1 from Eq. 1) on the total set of relevant bills introduced after the shock.

[24] In Table 5, the corporate campaign contribution share is calculated as a representative average over the entire 1980s.

[25] Hedonic analysis has been used to evaluate what have been the benefits from these regulations. A careful recent hedonic analysis by Greenstone and Gallagher (2005) concludes that one cannot reject the hypothesis that there is no increase in home prices in census tracts where there is a Superfund cleanup relative to price appreciation trends in communities that have hazardous waste sites that are not cleaned up. One interpretation of this finding is that the marginal home owner does not trust government as being up to the job of removing the hazardous waste. Bui and Mayer (2003) examine the relationship between zip code toxic release inventory emissions and local home prices and find little correlation between the two.

Not all environmental shocks lead to significant regulatory growth. The Chernobyl shocks had little impact on the Nuclear Regulatory Commission:

> U.S. reactors have different plant designs, broader shutdown margins, robust containment structures, and operational controls to protect them against the combination of lapses that led to the accident at Chernobyl….Assessments in the light of Chernobyl have indicated that the causes of the accident have been adequately dealt with in the design of U.S. commercial reactors. However, the Chernobyl accident emphasized the importance of safe design in both concept and implementation, of operational controls, of competence and motivation of plant management and operating staff to operate in strict compliance with controls, and of backup features of defense-in-depth against potential accidents. (http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/chernobyl-bg.html)

The Three Mile Island accident brought about more regulatory activity, but given the fact that the United States has a small number of nuclear power plants, such improvements in plant workers' human capital and disaster preparation has only a limited aggregate effect. The shock brought about "sweeping changes involving emergency response planning, reactor operator training, human factors engineering, radiation protection, and many other areas of nuclear power plant operations. It also caused the US Nuclear Regulatory Commission to tighten and heighten its regulatory oversight.[26] One example of regulatory changes in the aftermath of Three Mile Island was the expansion of the NRC's resident inspector program—first authorized in 1977—whereby at least two inspectors live nearby and work exclusively at each plant in the US to provide daily surveillance of licensee adherence to NRC regulations.[27]

In the aftermath of the Bhopal disaster, the toxic release inventory (TRI) was created. Under this program, manufacturing facilities that are larger than a threshold size must report their annual emissions of a large number of chemicals to the EPA. The EPA audits a subset of these facilities to check for truthful reporting. In 1993, the EPA conducted 836 inspections. Since there were 23,000 TRI filers this represents a 2.7% sample (see Hamilton 2005). Relative to other EPA programs, the TRI is a small program. Hamilton (2005) reports that in fiscal year 2004, the EPA's total budget was $8.37 billion while the TRI program division's share was $6.6 million.[28]

Oil spill regulation enacted after the Exxon Valdez spill was targeted towards giving oil shipping companies incentives to engage in greater precautionary spending to reduce the likelihood of future spills. Under the Oil Pollution Act of 1990, the owner or operator of a facility from which oil is discharged is liable for the costs associated with the containment or cleanup of the spill and any damages resulting from the spill (http://www.epa.gov/oilspill/opaover.htm). Epple and

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[26] See http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html.

[27] The NRC identified the importance of training and establishment of fitness-for-duty programs for plant workers to guard against alcohol or drug abuse. The NRC improved its emergency preparedness by requiring immediate NRC notification for plant events and an NRC operations center is now staffed 24 hours a day. (http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html).

[28] Hamilton (2005) provides greater details on the private costs that manufacturing facilities incur to comply with TRI regulation.

Visscher (1984) provide evidence that increases in regulatory enforcement are associated with a reduction in oil spills. Their evidence supports the intuitive claim that credible regulation changes the behavior of polluting for profit firms.

These five case studies highlight that regulatory growth is least likely to take place after shocks when there are relatively few polluters who need to be regulated (such as nuclear power plants) or when existing profit maximizing firms such as oil companies and manufacturing plants can be encouraged to alter their behavior based on credible fines and fear of social sanction. Superfund stands out as the outlier. Unlike the other cases, there were a very large number of hazardous waste sites that needed to be tested to rank their relative ranking for early cleanup. In addition, since these sites had been abandoned there was no active economic agent who could be confronted with a menu of incentives to "green" his behavior. Due to these factors, the EPA acquired the role of both identifying what sites needed cleanup and determining how much to invest to clean them (Sigman 2001).

4 Conclusion

This paper has conducted an event analysis to study the role of five environmental disasters in shaping US regulatory policy. Three Mile Island, Love Canal, Bhopal, Chernobyl and the Exxon Valdez oil spill all received extensive media coverage. After these events, the count of related congressional hearings sharply increased and the Congress voted on legislation related to these events.

Using a panel data approach, I tested for whether these events *shocked* congressional representatives into increasing their propensity to vote "pro-environment" on legislation directly tied to the recent shocks. Overall, I find that the average representative reduced his pro-environment voting propensity on catalytic bills relative to his pro-environment voting record in the same calendar year on non-catalytic bills. My explanation for this counter-intuitive finding is bill selection. I documented that after catalytic events, legislation tied to the recent disasters is more likely to be sponsored by "green" representatives. Such representatives are likely to propose more stringent regulation.

Disaggregating the five shocks' effects reveals that Love Canal stands out as the shock that was associated with the largest increase in the propensity of representatives to vote pro-environment. For other shocks such as Chernobyl and the Exxon Valdez oil spill, I find that representatives were less likely to vote the pro-environment position on legislation tied to these shocks relative to other environmental legislation voted on in the same calendar years.

This study also highlighted how representatives differed with respect to how they responded to catalytic environmental shocks. Controlling for individual representative fixed effects and standard measures of representative ideology, liberal Northeastern representatives who received a small share of their campaign contributions from corporations were the most likely to increase their propensity to vote "pro-green" in the aftermath of environmental shocks.

This study has focused solely on risk regulation tied to environmental shocks. Future research could examine congressional voting in the aftermath of other shocks such as the attacks of September 11, 2001. If more ambitious risk regulation is voted

on in the aftermath of shocks, does this raise the likelihood of more socially inefficient regulation being adopted as "passions flare"? Alternatively, do such shocks raise the likelihood of Pareto improving regulations being enacted because they help diffused consumer interest groups overcome free-rider problems?

Appendix A

A brief description of five environmental shocks

Love Canal, New York Throughout the 1940s and 1950s, the Love Canal area was a landfill for industrial waste and more than 21,000 tons of chemical wastes were ultimately deposited there. In the 1970s, Love Canal residents began to complain of health problems, including high rates of cancer, birth defects, miscarriages, and skin ailments. Eventually, New York State found high concentrations of dangerous chemicals in the air and soil. The Environmental Protection Agency claims that 56% of the children born in Love Canal between 1974 and 1978 had birth defects (Greenstone and Gallagher 2005). The New York Health Commissioner declared a public emergency on August 2, 1978. Within 2 weeks, President Carter declared an emergency in the area.

Three Mile Island The accident at the Three Mile Island Unit 2 (TMI-2) nuclear power plant near Middletown, Pennsylvania on March 28, 1979 was the most serious in US commercial nuclear power plant operating history, even though it led to no deaths or injuries to plant workers or members of the nearby community. The sequence of certain events—equipment malfunctions, design related problems and worker errors—led to a partial meltdown of the TMI-2 reactor core but only very small off-site releases of radioactivity.

Bhopal On December 3, 1984, a Union Carbide plant in Bhopal, India sprang a leak, releasing thousands of gallons of highly toxic gas into the atmosphere. By the time the leak was sealed, over 2,000 people had died.

Chernobyl On April 25 and 26, 1986, the world's worst nuclear power accident occurred at the Chernobyl power plant 80 miles north of Kiev (in what is now the Ukraine). The Chernobyl accident killed more than 30 people immediately, and as a result of the high radiation levels in the surrounding 20-mile radius, 135,000 people had to be evacuated.

Exxon Valdez On March 24, 1989, the Exxon Valdez grounded on Bligh Reef and spilled nearly 11 million gallons of oil into the biologically rich waters of Prince William Sound.

Appendix B

Fifteen catalytic votes[a]

Three Mile Island

1. HR 4338, Emergency Evacuation Plans for Nuclear Plants. The vote is on the Weaver amendment to prohibit the use of Nuclear Regulatory Commission (NRC) funds for issuing operating licenses for nuclear power plants in states which had not submitted an emergency evacuation plan approved by the NRC. This was the first major nuclear vote in the House after the Three Mile Island accident. The amendment would probably have delayed operating licenses for some nuclear plants and highlighted the dangers involved for large population centers. It might also have allowed some states to block the licensing of new nuclear plants within their borders by refusing to submit any evacuation plan. Rejected 147-235 on June 18, 1979. Yes is the pro-green vote.

2. Nuclear Breeder Reactor HR 3000, Energy Department Civilian Programs. The vote is on the Fuqua amendment to terminate the Clinch River fast breeder reactor and to authorize $107 million to carry out a Department of Energy study and design for an alternative breeder. This represents a compromise by the Carter Administration which for 3 years previously had attempted to halt construction at Clinch River without making any serious commitment to build other breeder technologies. Amendment rejected 182-237 on July 26, 1980. Yes is the pro-green vote.

3. Nuclear Reactor Safety, HR 2608, Nuclear Regulatory Commission authorizations. The vote is on the Bingham amendment to require the NRC to report to Congress on which operating reactors were in compliance with specific safety regulations. The NRC was also required to supply a list of generic safety issues and problems which afflict many reactors. Since the NRC has added enormously to its list of safety requirements in recent years, many plants built earlier are not in compliance and widespread "grandfathering" procedures have allowed plants less than 5 years old to fall 10 to 15 years behind current safety standards. The passage of this amendment represents a major victory for environmentalists and provided them with much needed information to embarrass the nuclear industry and to press for safety reforms. Adopted 217-161 on November 29, 1979. Yes is the pro-green vote.

4. Nuclear Construction Moratorium, HR 2608, Nuclear Regulatory Commission authorizations. The vote is on the Markey amendment to put a 6-month moratorium on any new nuclear plant construction permits. This was considered a key test vote on nuclear power and the first time members voted after the Kemeny Commission had published its report criticizing the NRC for its handling of the accident at Three Mile Island. The effect of the amendment was partially symbolic since the NRC had a self-imposed moratorium on construction permits until the Three Mile Island accident was fully studied. The amendment did not apply to nuclear plants already under construction and would at the very most have affected from six to eight plants that were close to

requesting permits. The Carter Administration opposed this amendment. Rejected 135-254 on November 29, 1979. Yes is the pro-green vote.

Love Canal

5. HR 7020, Cleaning Up Toxic Chemicals. This is the vote to suspend the rules and pass the bill creating a $1.6 billion "Superfund" to finance the cleanup of toxic chemicals that are dumped or spilled into the environment. The EPA was made responsible for handling the fund and cleanup. Eighty-six percent of the money will come from taxes on the oil and chemical industry. The government was given authority to sue the companies who did the dumping for the cleanup costs and for up to $50 million in damages to natural resources. Oil spills, however, were not covered. The President was given some new authority to take action to clean up and prevent spills and to control hazardous substances threatening the public health. The bill was not as strong as an earlier Senate bill that also compensated victims for damages, but it was a major accomplishment nonetheless. Adopted 274-94 on December 3, 1980. Yes is the pro-green vote.

6. Hazardous waste regulation. The Gramm (D, TX) amendment sought to exempt businesses which generate, store or transport relatively small quantities of hazardous waste from the Resource Conservation and Recovery Act. The RCRA is the nation's principal law governing the management and disposal of these wastes and was designed to avoid the creation of additional abandoned toxic dumps like Love Canal. Amendment rejected 148-183 on September 8, 1982. No is the pro-green vote.

7. Elimination of the Common Law Legal right of hazardous waste victims. Dannemeyer (R, CA) amendment to the RCRA reauthorization bill to remove a provision that preserves the right of individuals and state and local governments to sue hazardous waste generators under the common law. Amendment rejected 85-255 on September 8, 1982. No is the pro-green vote.

Bhopal

8. Superfund Right to Know. This was on the Edgar-Sikorski Amendment to require polluters to publicly report any significant emission of cancer-causing and other extremely hazardous chemicals. This amendment created the Toxic Release Inventory database. Adopted 212-211 on December 10, 1985. Yes is the pro-green vote.

Chernobyl

9. Nuclear Liability no. 1, amendment to HR 1414. The Price-Anderson Act was first passed in 1957. It was intended as a temporary ten-year measure to encourage the development of the newly formed nuclear power industry. It has been extended twice and expired on August 1, 1987. The Act protects the utilities and their contractors from liability in the event of an accident. The nuclear industry is the only industry in the US which does not have to pay full damages including compensation for death, injury and property damage caused by an accident. This vote is on the Eckart amendment to make the owners of commercial nuclear power plants responsible for fully compensating accident victims. After an accident, the owners of nuclear plants would be required to pay a limited amount of money into a compensation fund for as many years as necessary to fully compensate damages. The Eckart amendment was rejected 119-300 on July 29, 1987. Yes is the pro-green vote.

10. Nuclear Liability no. 2. This is another amendment to HR 1414, the Price-Anderson Act. The vote is on the Wyden amendment, which would make the private companies that carry out the Department of Energy's nuclear programs liable for accidents caused by gross negligence or intentional misconduct. Under the Price-Anderson Act, these federal contractors are totally exempted from any accident liability. This amendment covered all aspects of the federal nuclear program, ranging from weapons production, research and testing to radioactive waste transportation, storage and disposal. Wyden Amendment rejected 193-226 on July 29, 1987. Yes is the pro-green vote.

11. Nuclear plant licensing. This vote was on the Markey amendment to prohibit the NRC from licensing for full power operation the nuclear power plants at Seabrook, New Hampshire and Shoreham, New York unless the emergency evacuation plans met the old NRC rules. The amendment was rejected 160-261 on August 5, 1987. Yes is the pro-green vote.

Exxon Valdez

12. Oil Spill Liability and States' Rights. To amend the Miller (D, CA) amendment to HR 1465, oil pollution limits, to remove provisions that dealt with state authority as it related to cleanups. Amendment rejected 151-270 on November 8, 1989. No is the pro-green vote.

13. The Hughes amendment would have prevented state and local laws from setting higher liability limits than those in the House bill. The amendment would have repealed the laws of several states such as Alaska, California, and Maine which require the spiller of oil to pay the full cost of cleanup. Amendment rejected 171-252 on November 8, 1989. No is the pro-green vote.

14. To amend HR 1465, oil pollution limits, to change the liability standards so that liability limits would not apply to spills due to negligence as opposed to gross negligence. Adopted 213-207 on November 8, 1989. Yes is the pro-green vote.

15. To amend HR 1465, oil pollution limits, to change the liability standards so that liability limits would not apply to spills due to negligence as opposed to gross negligence or willful misconduct. Rejected 185-197 on November 9, 1989. Yes is the pro-green vote.

[a]Data Sources are the League of Conservation Voters Scorecards (see www.lcv.org) and Keith Poole's Voteview webpage.

Appendix C

Case study of the Post-Exxon Valdez legislation chronology

NOVEMBER 8, 1989[b]
   $Y=151$ $N=270$ TAUZIN (D, LA)
   To amend the Miller (D, CA) amendment to HR 1465, oil pollution limits, to remove provisions that dealt with state authority as it related to cleanups.
   NOVEMBER 8, 1989
   $Y=279$ $N=143$ MILLER (D, CA)

To amend HR 1465, oil pollution limits, to prevent federal law from preempting state laws that deal with oil spill liability and related issues.

NOVEMBER 8, 1989

Y=169 N=251 SHUMWAY (R, CA)

To amend HR 1465, oil pollution limits, to allow a party to be able to seek redress under either federal or state law, but not both.

NOVEMBER 8, 1989[b]

Y=171 N=252 HUGHES (D, NJ)

To amend HR 1465, oil pollution limits, to prohibit state or local liability limits higher than those set in this legislation.

NOVEMBER 8, 1989[b]

Y=213 N=207 MILLER (D, CA)

To amend HR 1465, oil pollution limits, to change the liability standards so that liability limits would not apply to spills due to negligence as opposed to gross negligence.

NOVEMBER 9, 1989[b]

Y=185 N=197 MILLER (D, CA)

To amend HR 1465, oil pollution limits, to change the liability standards so that liability limits would not apply to spills due to negligence as opposed to gross negligence or willful misconduct.

NOVEMBER 9, 1989

Y=375 N=5

To pass HR 1465, oil pollution limits, to set limits on liability and damages caused by oil spills and to establish a fund to help pay for those damages.

[b]Indicates that the LCV identified this vote as a "key" vote.

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