

LOBBYING FOR SOCIAL VERSUS INDUSTRIAL ISSUES

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Abstract

This paper applies the common agency framework to analyze how lobbying influences environmental policy in the United States. Assuming asymmetric information on the ideology of the policy-maker, policy-makers are expected to have a high weight placed on social welfare for social issues such as environmental policy because of electoral concerns. The empirical analysis tests this hypothesis in a single lobby and competing lobbies framework. The empirical results seem to support our theory. Environmental contributions have a greater effect in promoting energy efficient policies than energy contributions have in suppressing energy efficient policies.

1. Introduction

The main reason why politicians do care about social welfare is that it helps them get re-elected. However, the politician's utility function is not merely representative of this Downsian paradigm (Downs 1957) because politicians also gain from monetary contributions from lobbying groups. These groups may or may not promote policies that improve social welfare. Therefore, a politician faces a trade-off between maximizing social welfare and lobbying contributions. This definition of the policy-maker's utility function follows the political support approach adopted by Grossman and Helpman (1994). Contributions help improve a policy-maker's re-election prospects by funding his re-election campaign. Contributions also serve as proxies for the lobbying influence which shapes the life of politicians once their political careers end. This is well known as the "revolving doors" phenomena; people who work in government find jobs in the companies that lobbied them or employees from lobbying companies find position within their industry's regulators. This is the major aspect of regulatory capture (see Laffont and Tirole 1991, Levin and Forrence 1990). However, this effect has been shown to be limited (Heinz et al. 1993, Nixon et al. 2002). The importance of contributions in the American political process is exemplified by their immense magnitude during election cycle years. Total contributions at the State-level totalled \$2.335 billion in 2012 and \$3.5 billion in 2010 (National Institute on Money in State Politics). At the Federal-level, \$3.187 billion were raised in 2012 to fund the 2012 election cycle which cost \$6.266 billion (Center for Responsive Politics).

For a given issue, policy-makers choose the policy that maximizes their utility function. However, the policy-maker's utility function is different for every issue depending on the policy-maker's relative preferences for social welfare and lobbying contributions. A policy-maker may

value social welfare more (and lobbying contributions less) for a particular issue because he has a special affinity for the issue or, most importantly, the public has a special affinity for the issue.

This paper tries to disentangle the effect of lobbying contributions from ideological concerns. We claim that policymakers have different preferences towards “social” and “industrial” issues. It is harder to influence policymakers in social aspects of policy-making such as environmental policies than industrial issues such as business regulation. This can be explained by the Grossman and Helpman model and Martimort and Semenov (2008) where policy-makers place a higher value on social welfare for social issues than they do for industrial issues. Social issues have direct influence on electoral motives. If a policymaker votes in a committee or during congressional votes against promoting energy efficiency it is known to the public. This voting may severely impede the electoral prospects of the policy-maker depending on the information transmission of the policy-maker’s voting record and the importance that the public places on energy efficiency. A policy-maker may also be more “civic-minded” when it comes to social issues because it has a more direct effect on social welfare than industrial issues like business regulation. In other words, policy-makers are less corruptible when policies are related to transparent and/or sensitive issues.

We use a general theory which borrows from the model by Martimort and Semenov (2008). We test the theoretical prediction of the model that policy-makers will place a high value on social welfare for a social issue such as environmental policy. For environmental policy, the dependent variable is a measure of energy efficiency and the independent variables are pro-environment group contributions, energy and natural resource group contributions, the level of State corruptibility, and ideology variables. Our testable implications are that environmental contributions positively influence a State’s energy efficiency while energy contributions negatively influence a State’s energy efficiency. Furthermore, in a competing lobbies framework, the magnitude of the influence from environmental contributions should be greater than the magnitude of the influence from energy contributions. This implies that policy-makers place a greater weight on improving social welfare than they do on receiving contributions and decreasing social welfare. Our empirical analysis for the years 2010-2012 confirm these hypotheses. In both the single lobby framework and the competing lobbies framework, environmental contributions tend to increase energy efficiency and energy contributions tend to

decrease energy efficiency. Furthermore, in the competing lobbies framework, the marginal increase in energy efficiency from an additional dollar of environmental contributions is greater in magnitude than the marginal decrease in energy efficiency from an additional dollar of energy contributions. Higher levels of lobbying disclosure increase energy efficiency as well as more Democrats in each of the three levels of State government.

The structure of the paper is as follows. Section 2 presents a review of the literature. A particular focus is placed on the Grossman-Helpman model and the various empirical tests of the model. Section 3 explains the choice of environmental policy for analysis and describes the lobbying environment for this issue. Section 4 presents the general theory which is taken from Martimort and Semenov (2008). Section 5 presents the econometric models for a single lobby framework and a competing lobbies framework as well as a detailed discussion of the data. Section 6 presents the empirical results. Section 7 summarizes the results and provides topics for further study.

2. Literature Review

The basic model of how special-interest contributions influence government policy comes from Grossman and Helpman (1994) which is in part based on the common agency model developed by Bernheim and Whinston (1986). They adopt the political support approach pioneered by Stigler (1971) and first applied to trade protection by Hillman (1982) which argues that policymakers choose policies that maximize their chance of being re-elected by considering social welfare and lobbying contributions. In the Grossman and Helpman (1994) model, an incumbent politician's objective function is a weighted sum of total lobbying contributions and aggregate social welfare. Aggregate social welfare serves as a proxy for the politician's chances of being re-elected because increasing social welfare is expected to monotonically provide more votes from the voting public. A politician may also derive utility from social welfare if he or she is civil-minded. Politicians use lobbying contributions to finance future campaigns, retire debts from previous campaigns, deter potential political competitors, and show the candidate's ability as a fundraiser. In a model of complete information, the policy-maker's weights to social welfare and lobbying contributions are common knowledge (Le Breton and Salanie 2003). Interest

groups are motivated to make contributions not to influence election outcomes but to influence policy outcomes.

When the Grossman-Helpman (hereafter GH) model is tested using empirical data, many papers (Goldberg and Maggi 1999, Gawande and Bandyopadhyay 2000, Belloc 2007) have found high estimates on the coefficient for social welfare in the government's objective function. This implies a high level of welfare-mindedness by governments. Contrary findings have been shown in Bradford (2003) who finds that policy-makers value lobbying contributions 15% more than they do consumer surplus.

Goldberg and Maggi (1999) test the GH model using empirical data on non-tariff barriers in the United States in 1983. Their objective is to test the predictions of the GH model that cross-sectional differences in trade protection are caused by differences in import elasticity, import penetration ratio, and whether the industry is organized. Their empirical results support most of the predictions of the GH model. One important finding is that trade protection is decreasing with import penetration among organized industries and increasing with import penetration among unorganized industries. Therefore, the relationship between trade protection and import penetration is conditional on whether an industry is organized or disorganized. Ederington and Minier (2005) object to this finding by noting that all relevant organizations are organized to some degree so the relationship between trade protection and import penetration should not be conditional on whether an industry is organized or disorganized. Even the industries that were classified as disorganized in Goldberg and Maggi (1999) made lobbying contributions and received positive amounts of trade protection, contrary to the GH model. Ederington and Minier (2005) suggest that economists should reconsider empirical tests such as Goldberg and Maggi (1999) and be wary of mis-specification error. Le Breton and Salanie (2003) describe an extension of the GH model that ignores whether an industry is organized or disorganized.

The Goldberg and Maggi (1999) empirical study finds that the weight of welfare in a government's objective is about 0.98 while the weight of lobbying contributions is 0.02. This finding makes sense since the average coverage ratio in 1983 was 0.13 which is very close to a policy of free trade where the coverage ratio is equal to 0. However, the hypothesis that governments are pure welfare maximizers can be rejected as the coefficient for welfare does not equal one, even with a 99% confidence level.

Belloc (2007) obtained similar results when applying the GH model to the European Union. The paper finds that the weight that policy-makers place on social welfare is several times larger than the weight that they place on contributions. However, Belloc (2007) rejects the hypothesis that the European Union government is a pure welfare-maximizer at all confidence levels. These findings are consistent with the predictions of the GH model and similar to the findings of Goldberg and Maggi (1999).

Gawande et al. (2005) try to explain the high welfare-mindedness found these empirical studies by incorporating competing interest groups. For the issue of trade barriers, input suppliers (upstream users) would prefer more trade protection for their inputs while manufacturers (downstream users) would prefer less trade protection for those inputs that are used in production. They argue that since upstream and downstream groups compete for influence, their impacts cancel each other out leading to a high weight given to social welfare relative to contributions. In their empirical analysis of over 40 countries, lobbying competition decreases the welfare-mindedness of governments in virtually every country. Therefore, one should not conclude that a government is welfare-minded merely by observing free trade because the free trade may arise from lobbying competition with a government that values welfare very little.

Martimort and Semenov (2008) explain that the high weight of social welfare is caused by asymmetric information of the policy-maker's ideology. When interest groups are uncertain about the policy-maker's ideology the transactions costs arising from this asymmetric information are high so interest groups refrain from contributing. This allows the policy-maker to pursue to socially optimal policy. Furthermore, issues that are highly relevant to the public, say social issues, should result in stronger ideological biases leading to a higher weight placed on social welfare by policy-makers.

Recent years have brought attempts to analyze special interest politics relating to environmental policies (Aidt 1998, Damania 2001). Many of these papers show how special interest groups distort environmental policies away from the socially optimal level. One reason is that firms are incentivised to underinvest in energy-efficient technologies because that money can be better used to lobby policy-makers to prevent energy-efficient policies, even though firms benefit from energy-efficient technologies through lower production costs (Damania 2001 and Farzin and Zhao 2003). Aidt (1998) reasons that the political equilibrium is not socially efficient

because citizens are not as organized and well-represented as energy firms. This follows to Olsonian belief that smaller groups such as industry groups are more able and more likely to organize and act in their common interest than large groups such as the electorate (Olson (1965). Therefore, a small organized group can influence policy outcomes that are detrimental to the larger unorganized group. Cropper et al. (1992) show that special interests do have an influence on environmental regulation as the United States Environmental Protection Agency considers special interests and social welfare when setting environmental standards.

Environmental policies may also be distorted from the socially optimal level due to election concerns. List and Sturm (2005) show that elections not only influence primary issues that affect all of the electorate such as income redistribution but may also affect secondary issues such as environmental policy that do not necessarily matter to most of the electorate. This is because a secondary issue such as environmental policy may induce “single issue voters” which vote depending only on a politician’s stance on a specific issue. Therefore a politician will try to court these single issue voters during elections. In U.S. States with more environmental groups, State Governors will promote more environmentally friendly policies early in their term and less environmentally friendly policies when they are nearing the end of their term limit. In States with less environmental groups, State Governors will promote less environmentally friendly policies early in their term and more environmentally friendly policies when they are nearing the end of their term limit.

Wilson and Damania (2005) extend the GH model to allow a firm to lobby both political parties. Therefore the weight that policy-makers place on social welfare is determined endogenously by the intensity of political competition instead of being an exogenous variable in the GH model. In their political competition model, higher intensities of political competition lead to more socially optimal environmental policies however even at the maximum level of political competition, welfare is not maximized and some corruption still exists. One possible reason that the authors provide is that competing political parties may converge their policies to a single point to minimize the political cost of accepting lobbying contributions and deviating from the socially optimal policy. They provide anecdotal evidence of such policy convergence around the world but acknowledge that there have been no formal empirical tests. There are however empirical tests that show that environmental lobbying and political competition increase the

stringency of environmental policy. Fredriksson et al (2004) tests data on the lead content of gasoline in OECD and developing countries and find that greater political competition leads to lower lead content, especially in countries with high democratic participation by citizens. This implies that the impact of political competition on social welfare is conditional on the pressure that the citizens put on the policy-makers. Furthermore, the authors find that a greater amount of environmental groups leads to more stringent environmental policies. It should be noted that they make no distinction between the size of the environmental groups and their level of contributions. Empirical studies on the influence of the amount of environmental contributions on policy outcomes shows that higher levels of environmental contributions lead to higher pollution taxes in small open economies (Fredriksson 1997 and Aidt 1998).

One interesting aspect of environmental issues is it tends to be a transboundary issue. Environmental problems such as global warming, acid rain, and air pollution may be exacerbated in one economy and the consequences may be experienced in another economy. When multiple economies are considered, greater environmental contributions does not necessarily lead to greater domestic environmental policies [Fredriksson (1997), Aidt (1998) and Aidt (2005)]. Aidt (2005) assumes that environmental lobbies care sufficiently about pollution abroad or total global emissions. Therefore, environmental lobbies would accept relatively more pollution through less stringent regulations in their own economy if it meant relatively less emissions abroad. However, these papers mostly focus on air pollution since it is the best example of a transboundary environmental concern. This paper focuses on environmental policy that addresses the whole spectrum of environmental issues, many of which are domestic issues, so the issue of transboundary influence is ignored.

3. Environmental Policy

Environmental policy was chosen as the social issue because it has risen in the social consciousness in recent decades to become one of the most prominent social issues today. This implies that the voting public is highly responsive to environmentally-friendly policies so the policy-maker should place a high value on social welfare for environmental policy.

Environmental policy is also an interesting issue to examine because it has both a social component and an industrial component. It is a one-dimensional policy with competing and polarized interest groups. Greater environmental regulation increases social welfare through greater environmental quality, however it reduces profits for energy and natural resources firms through lower demand and/or higher production costs. For example, a carbon tax reduces carbon emissions but increases the cost of production for many businesses leading to a reduced demand for carbon emitting fuels. Therefore, pro-environment interest groups compete with energy and natural resource interest groups for influence which, Gawande et al. (2005) predicts, should lead to a high weight placed on social welfare by policy makers.

From Damania (2001) and Farzin and Zhao (2003), firms have an incentive to lobby heavily against pro-environment policy instead of investment in energy-efficient technologies. Furthermore, energy and natural resource companies earn a positive return on their investment of lobbying contributions. Hill et al. (2011) found that annual excess stock return of the average lobbying firm was two percent greater than non-lobbying firms. Thus, one would expect significant contributions from energy and natural resources groups compared to pro-environment groups. While environmental groups lobby policymakers to achieve a non-monetary social result, energy companies lobby policymakers to achieve a financial return which in turn allows them to make more lobby contributions. From 2008 to 2012, energy and natural resource contributions totalled \$412.85 million while environmental contributions totalled 54.28 million, a ratio of 7.6:1 (National Institute on Money in State Politics).

In 2012 88.1% of donations from pro-environment groups that went to a political party went to the Democratic Party in 2012, a slight decrease from 88.8% in 2010 (Appendix 1). Conversely, 67.7% of donations from energy and natural resource groups that went to a political party went to the Republican Party (Appendix 2). This is a slight increase from 66.8% in 2010. If we assume that the Democratic Party is more inclined – and the Republican Party is less inclined – to implement environmentally friendly policies, then this supports the theory from Martimort and Semenov (2008) that asymmetrical information costs cause interest groups to target policy-makers who are ideologically close. The fact that pro-environmental groups contribute almost exclusively to the Democratic Party and do not contribute to policy-makers whose ideology is distant also supports our assumption that the policy-maker's ideological bias is high when it

comes to a social issue such as environmental policy. Relative to pro-environment groups, energy and natural resource groups spread their contributions more evenly between policy-makers of varying ideology which supports our assumption that there is less ideological bias for industrial issues which are less relevant to the voting public.

4. Theory

Policy makers choose a level of policy that maximizes their objective: the sum of aggregate social welfare and lobbying contributions. The self-interested policymaker makes a trade-off between the demands of lobby groups and the welfare of the voters.

4.1 Single Lobby

Consider a policy-maker P and a single lobby i . The policymaker's quasi-linear utility is:

$$V_P(t, q) = t_i - \frac{\beta_i}{2} (q - \theta)^2$$

Lobby i 's utility is:

$$V_i(t, q) = -t_i - \frac{1}{2} (q - \theta - \delta_i)^2$$

where q = the actual policy parameter, θ = the policy-maker's ideal policy, and δ_i = the discrepancy between the lobby's ideal policy and the policy-maker's ideal policy. Lobby i 's ideal policy is equal to $\theta - \delta_i$. The policy-maker has private information on his own ideology parameter θ .

The higher β is the harder it is to influence the policymaker with monetary incentives. The parameter β represents the weight that the policy-maker places on social welfare. As β increases, the policy-maker places a greater weight on social welfare relative to contributions.

Let $i = \text{ENV}$ for environmental lobbies and $i = \text{NRG}$ for energy lobbies. Based on the theory from Martimort and Semenov (2008), β_{ENV} is expected to be greater than β_{NRG} because

environmental policy is a social issue. Therefore, the policy-maker will place a greater weight on social welfare than on monetary contributions.

4.2 Competing Lobbies

Now we consider a framework with one policy-maker and two competing lobbies: environmental groups, ENV, and energy groups, NRG. These two lobbies compete for influence of the single policy maker. The policy-maker's utility is now:

$$V_P(t, q) = \frac{1}{\beta_{ENV}} t_{ENV} + \frac{1}{\beta_{NRG}} t_{NRG} - \frac{1}{2} (q - \theta)^2$$

Each lobby's utility function remains the same as in the single lobby framework because their lobbying decision is independent of the decisions of other lobbies.

$$V_{ENV}(t, q) = -t_{ENV} - \frac{1}{2} (q - \theta - \delta_{ENV})^2$$

$$V_{NRG}(t, q) = -t_{NRG} - \frac{1}{2} (q - \theta - \delta_{NRG})^2$$

The fact that the policy-maker has two different β values, one for environmental lobbies and another for energy lobbies, may be difficult to reconcile because this means that the policy-maker places a different value on social welfare at different times. However there are possible explanations. First, the β values may not reflect the policy-maker's one true value of social welfare, but rather his or her apparent value of social welfare. Therefore, the policy-maker has β_{ENV} when dealing with environmental groups and β_{NRG} when dealing with energy groups. Another possible explanation is that V_P represents the aggregate utility of several policy-makers rather than just one. Therefore the two different β values represent the true β value for two different groups of policy makers. The empirical analysis of this paper assumes the latter explanation and analyzes policy-makers in aggregate.

5. The Econometric Model

In a single lobby framework, the econometric models are:

$$W = \beta_{ENV}C_{ENV} + \gamma R + \delta H + \tau S + \varphi G$$

$$\text{and } W = \beta_{NRG}C_{NRG} + \gamma R + \delta H + \tau S + \varphi G$$

where W = a measure of energy efficiency, C_{ENV} = total State pro-environment lobby contributions as a percentage of total contributions from all interest groups, C_{NRG} = total State energy and natural resource lobby contributions as a percentage of total contributions from all interest groups, R = level of corruption in the State legislature, H = percentage of Democrats in the State House, S = percentage of Democrats in the State Senate, and G is a dummy variable that equals 1 if the Governor of the State is a Democrat and 0 if the Governor of the State is a Republican. The variables H , S , and G collectively represent the ideology of the State's policy-makers.

In the competing lobbies framework, the econometric model is:

$$W = \beta_{ENV}C_{ENV} + \beta_{NRG}C_{NRG} + \gamma R + \delta H + \tau S + \varphi G$$

5.1 Testable Implications

1) $\beta_{ENV} > 0$

In the single lobby framework and competing lobbies framework, environmental contributions are expected to increase the measure of energy efficiency.

2) $\beta_{NRG} < 0$

In the single lobby framework and competing lobbies framework, energy contributions are expected to decrease the measure of energy efficiency.

3) $|\beta_{ENV}| > |\beta_{NRG}|$

In the competing lobbies framework, the main testable implication is that the increase in the measure of energy efficiency provided by marginal contributions from environmental groups should be greater than the decrease in the measure of energy efficiency provided by marginal contributions from energy groups. This implies that policy-makers place a greater weight on social welfare relative to the weight they place on total contributions.

5.2 Data

5.2.1 Measure of Social Welfare

W represents social welfare as a measure of the level energy-efficient policy. It is assumed that more energy-efficient policies purely increase social welfare and ignore the indirect impact that implementing energy-efficient policies has on a firm's cost structure and thus its ability to provide jobs and tax revenue to voters. The level of energy-efficient policy is provided by the American Council for an Energy-Efficient Economy (ACEEE) State Energy Efficiency Scorecard. This Scorecard assesses each State's policies and programs to improve energy-efficiency in six areas (Appendix 3):

- Utility and public benefits programs
- Transportation policies
- Building energy codes
- State government-led initiatives around energy efficiency
- Combined heat and power policies
- Appliance and equipment standards

A potential limitation or concern with the measure of social welfare is that it is a subjective ranking from a third-party organization rather than observed data. This metric was chosen to represent a proxy for overall policy response because as De Figueiredo and Silverman (2006) point out, it is difficult to distinguish contributions that target a specific policy or legislation. This also avoids the complication of the US legislative process where bills very rarely address a single issue in a specific field. Furthermore, taking all variables as a State aggregate allows us to reconcile the competing lobbies framework where there are two different

β values. For a more objective model, the data can be analyzed on a micro-level for each policymaker in a State. For example, the dependent variable could be whether the policymaker voted for a certain policy and the independent contribution variables are the lobbying contributions for just that policymaker. Note that a micro-level analysis would have to take the point of view that the policy maker has different β values at different times in order to reconcile the competing lobbies framework.

5.2.2 Contributions

Most studies, for simplicity of analysis, use a binary variable to identify whether an industry is organized or not. However, this practice homogenizes the State's lobbying environments which are vastly heterogeneous in nature. Therefore, this paper uses the total contributions from lobbies in order to capture the magnitude of the lobbying power in each State.

Data on contributions is obtained from the National Institute on Money in State Politics. Environmental contributions were filtered by "Pro-Environment Policy" while energy contributions were taken from all of the groups under "Energy and Natural Resources". These groups include energy providers such as oil and gas companies but also industrial interests such as steel companies and railroad companies (Appendix 4). The reason that the latter groups were included is because they also have a vested interest in impeding energy-efficiency. Firstly, they provide services to energy companies so they would like energy companies to have as much production as possible. Secondly, energy-efficient policies impose a cost for these companies as they must change their operations to meet stricter regulations. The data from the National Institute on Money in State Politics does not differentiate between missing data and null data. This problem is especially noticeable for environmental contributions where many States do not have data on environmental data for certain years. This paper takes these observations as zero, rather than excluding them from the regression, for several reasons. First, for certain years if States that did not have environmental contributions data were excluded from the regression then there would be too few observations for meaningful estimates to be generated. Second, environmental contributions are already typically low to begin with so it is reasonable to expect many States do not have any environmental contributions. Third, where environmental contribution data does not exist there exists energy contribution data so it cannot be assumed that

data was not available for that State. The environmental contributions and energy contributions are normalized by taking them as percentages of total contributions so that their values are between 0 and 1. Environmental contributions are assumed to be positively related to a State's energy efficiency score. Energy contributions are assumed to be negatively related to a State's energy efficiency score.

5.2.3 Corruptibility

The integrity/corruptibility of policymakers is represented by the State Integrity Investigation's State report card on lobbying disclosure. Each State is given a grade out of 100 based on six criteria:

- Is there a clear definition of a lobbyist in the State?
- Are lobbyists required to register with the State?
- Are lobbyists required to disclose spending?
- Are lobbyists' employers or principals required to disclose spending?
- Can citizens access the information reported from lobbyists to the State government?
- Is there effective monitoring of lobbying disclosure requirements?

A higher grade means that there is less lobbying corruption in the State. This measure can be used to reflect how easy it is for regulatory capture to occur. A higher score means more transparency which makes it harder to capture policy-makers. The integrity variable is kept constant through the years, which assumes a static lobbying environment for each State.

The coefficient γ is assumed to be positive meaning that the lower the corruptibility of policymakers the greater the social welfare, *ceteris paribus*. The applicability of this assumption to environmental policy is supported by the work of Fredriksson et al. (2004) who find that greater corruptibility of policymakers reduces energy policy stringency.

5.2.4 Ideology

The variables H, S, and G collectively represent the aggregate ideology. The variable H is equal to the percentage of Democrats in the State's House of Representatives (or State

equivalent). The variable S is equal to the percentage of Democrats in the State's House of Representatives. The variables H and S are between 0 and 1. The variable G is a dummy variable that is equal to 1 if the Governor is a Democrat and 0 if the Governor is a Republican. Each ideology coefficient is assumed to be positive meaning that a Democratic ideology increases energy efficiency.

Every State except for Nebraska has a bicameral legislature consisting of a smaller chamber known as the Senate and a larger chamber commonly known as a House of Representatives. Nebraska's legislature is unicameral and nonpartisan so it is excluded from this empirical analysis. Each State's executive branch is headed by a Governor belonging to either the Democratic or Republican Party except for Rhode Island's Lincoln Chafee who serves as an Independent. For the purposes of this analysis, Lincoln Chafee is considered as a Democrat¹.

6. Empirical Results

6.1 Single Lobby: Energy Lobby

The coefficient for energy contributions are negative in 2011 and 2012 but are not significantly different from zero in either year. Since contribution variables are specified as a proportion of total proportions that is between 0 and 1, an increase in the proportion of energy contributions of ten percentage points is expected to decrease the energy efficiency score by over 2 points. In 2010, the coefficient for energy contributions is positive however the very high p-value of 0.797 means that the coefficient is essentially equal to zero. In every year the coefficients for the non-contributions variables are positive as expected. Lobbying disclosure is the most significant non-contribution variable in every year. Its coefficient is significantly positive with 90% confidence in 2011 and 2012 and 95% confidence in 2010. The Governor variable tends to be the most significant of the three government ideology variables except for in 2010 when the House variable is much more significant than the Senate and Governor variables.

¹ Even though Chafee served as a Republican in the United States Senate from 1999 to 2006, he was often considered as one of the top "Republicans in name only" (Human Events 2010). Specifically, Chafee is a staunch supporter of the environment and has received endorsements from pro-environment groups including the Sierra Club and the League of Conservation Voters.

Table 1 2012, Only Energy Contributions

. reg aceee enerperc Tob demhou demsen gov

Source	SS	df	MS			
Model	2003.41063	5	400.682126	Number of obs =	48	
Residual	2775.25604	42	66.0775247	F(5, 42) =	6.06	
Total	4778.66667	47	101.673759	Prob > F =	0.0003	
				R-squared =	0.4192	
				Adj R-squared =	0.3501	
				Root MSE =	8.1288	

aceee	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
enerperc	-20.09448	40.54507	-0.50	0.623	-101.9177	61.72877
Tob	.161016	.087065	1.85	0.071	-.0146884	.3367203
demhou	10.93503	17.96673	0.61	0.546	-25.32331	47.19336
demsen	6.345208	13.84963	0.46	0.649	-21.60448	34.2949
gov	5.333169	3.153885	1.69	0.098	-1.031628	11.69797
_cons	-.6425064	6.738082	-0.10	0.924	-14.24051	12.95549

Table 2 2011, Only Energy Contributions

. reg aceee enerperc Tob demhou demsen gov

Source	SS	df	MS			
Model	1947.29191	5	389.458381	Number of obs =	47	
Residual	3170.86767	41	77.3382358	F(5, 41) =	5.04	
Total	5118.15957	46	111.264339	Prob > F =	0.0011	
				R-squared =	0.3805	
				Adj R-squared =	0.3049	
				Root MSE =	8.7942	

aceee	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
enerperc	-22.62197	29.10791	-0.78	0.442	-81.40658	36.16263
Tob	.1625135	.0941727	1.73	0.092	-.0276722	.3526992
demhou	18.40499	18.75347	0.98	0.332	-19.46841	56.2784
demsen	6.190661	14.72385	0.42	0.676	-23.54476	35.92608
gov	3.497811	3.261808	1.07	0.290	-3.089545	10.08517
_cons	-2.386478	7.158425	-0.33	0.741	-16.84321	12.07025

Table 3 2010, Only Energy Contributions

. reg aceee enerperc lob demhou demsen gov

Source	SS	df	MS			
Model	1838.62074	5	367.724147	Number of obs =	46	
Residual	3527.03144	40	88.175786	F(5, 40) =	4.17	
Total	5365.65217	45	119.236715	Prob > F =	0.0038	
				R-squared =	0.3427	
				Adj R-squared =	0.2605	
				Root MSE =	9.3902	

aceee	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
enerperc	15.63755	60.38392	0.26	0.797	-106.4029	137.678
lob	.2133027	.099785	2.14	0.039	.0116297	.4149757
demhou	27.23827	19.69113	1.38	0.174	-12.559	67.03554
demsen	3.849383	16.30745	0.24	0.815	-29.1092	36.80797
gov	.617285	2.886626	0.21	0.832	-5.216805	6.451375
_cons	-14.12838	8.654798	-1.63	0.110	-31.62038	3.363616

6.2 Single Lobby: Environmental Lobby

When there is only an environmental lobby, environmental contributions significantly increase the energy efficiency score with 85% confidence in 2012 and 99% confidence in 2010. The coefficient for environmental contributions is still positive in 2011 but with very large standard errors. An increase in the proportion of environmental contributions by ten percentage points is expected to increase the energy efficiency score by between 18.7 and 55 points. As in the single energy lobby framework, all of the non-contributions variables are positive except in 2010 where the coefficients for the Senate and Governor variables are negative but with relatively large standard errors. The lobbying disclosure variable is significantly positive with 95% confidence in 2012, 90% confidence in 2011 and 85% confidence in 2010. The Governor variable is the most significant of the three government ideology variables except in 2010 where the House variable is significant with 95% confidence. The magnitude of the coefficient for environmental contributions is much greater than the magnitude of the coefficient for energy contributions when comparing the two single lobby frameworks.

Table 4 2012 Only Environmental Contributions

. reg aceee envperc l0b demhou demsen gov

Source	SS	df	MS			
Model	2143.93323	5	428.786647	Number of obs =	48	
Residual	2634.73343	42	62.7317484	F(5, 42) =	6.84	
Total	4778.66667	47	101.673759	Prob > F =	0.0001	
				R-squared =	0.4486	
				Adj R-squared =	0.3830	
				Root MSE =	7.9203	

aceee	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
envperc	187.9804	118.9181	1.58	0.121	-52.00617	427.9669
l0b	.1921799	.081163	2.37	0.023	.0283864	.3559735
demhou	5.17909	17.83382	0.29	0.773	-30.81101	41.16919
demsen	10.17825	13.71448	0.74	0.462	-17.49869	37.8552
gov	6.399255	2.919887	2.19	0.034	.5066844	12.29183
_cons	-3.430075	5.663107	-0.61	0.548	-14.85869	7.998538

Table 5 2011 Only Environmental Contributions

. reg aceee envperc l0b demhou demsen gov

Source	SS	df	MS			
Model	1915.32607	5	383.065214	Number of obs =	47	
Residual	3202.8335	41	78.1178903	F(5, 41) =	4.90	
Total	5118.15957	46	111.264339	Prob > F =	0.0013	
				R-squared =	0.3742	
				Adj R-squared =	0.2979	
				Root MSE =	8.8384	

aceee	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
envperc	463.9653	1067.858	0.43	0.666	-1692.617	2620.548
l0b	.1808239	.0933598	1.94	0.060	-.0077201	.3693678
demhou	20.88944	18.78118	1.11	0.273	-17.03991	58.8188
demsen	3.440817	14.64693	0.23	0.815	-26.13926	33.02089
gov	3.850186	3.268847	1.18	0.246	-2.751384	10.45176
_cons	-4.797186	6.879888	-0.70	0.490	-18.6914	9.09703

Table 6 2010 Only Environmental Contributions

. reg aceee envperc lob demhou demsen gov

Source	SS	df	MS			
Model	2425.55024	5	485.110048	Number of obs =	46	
Residual	2940.10193	40	73.5025483	F(5, 40) =	6.60	
Total	5365.65217	45	119.236715	Prob > F =	0.0001	
				R-squared =	0.4521	
				Adj R-squared =	0.3836	
				Root MSE =	8.5734	

aceee	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
envperc	550.1641	193.7196	2.84	0.007	158.6421	941.686
lob	.1397729	.093638	1.49	0.143	-.0494766	.3290224
demhou	37.32575	18.18288	2.05	0.047	.5767842	74.07471
demsen	-5.378195	15.24092	-0.35	0.726	-36.18124	25.42485
gov	-.3677066	2.656185	-0.14	0.891	-5.736057	5.000644
_cons	-10.32728	6.868044	-1.50	0.141	-24.20812	3.55355

6.3 Competing Lobbies Framework: Energy and Environmental Lobbies

When environmental contributions and energy contributions are both included in the model, the results are mixed compared to the single lobby results. The R-squared does not increase by much if at all from the single lobby model in each year. However, most of the coefficient estimates fit their theoretical expectations. In 2012, both environmental contributions and energy contributions are more significant than in their respective single lobby models. In 2011, the coefficients for environmental contributions and energy contributions have the correct sign but neither is significantly different from zero. In 2010, the coefficient for environmental contributions is significantly positive with 99% confidence and the coefficient for energy contributions is negative but not significant. In each of the three years, the coefficient for environmental contributions is much greater in magnitude than the coefficient for energy contributions. An increase in the proportion of environmental contributions by ten percentage points is expected to increase the energy efficiency score by between 27.8 and 58.6 points. A ten percentage point increase in the proportion of energy contributions is expected to decrease the energy efficiency score by between 2.0 to 6.3 points. Just as in the single lobby framework, lobbying disclosure is the most significant non-contribution variable and is significantly positive with 90% confidence every year. The Governor variable is the most significant government

ideology variable in 2011 and 2012 and in 2012 the House variable is the most significant government ideology variable.

Table 7 2012, Energy and Environment Contributions

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. reg aceee envperc enerperc lob demhou demsen gov
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Source	SS	df	MS			
Model	2271.01271	6	378.502119	Number of obs =	48	
Residual	2507.65395	41	61.1622916	F(6, 41) =	6.19	
Total	4778.66667	47	101.673759	Prob > F =	0.0001	
				R-squared =	0.4752	
				Adj R-squared =	0.3984	
				Root MSE =	7.8206	

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
envperc	278.5984	133.1913	2.09	0.043	9.613181	547.5836
enerperc	-63.77908	44.24686	-1.44	0.157	-153.1374	25.57926
lob	.1569422	.0837869	1.87	0.068	-.0122689	.3261532
demhou	3.489427	17.64829	0.20	0.844	-32.15201	39.13086
demsen	12.15927	13.6114	0.89	0.377	-15.32951	39.64804
gov	5.018761	3.038037	1.65	0.106	-1.116678	11.1542
_cons	1.52839	6.565184	0.23	0.817	-11.73027	14.78705

Table 8 2011, Energy and Environment Contributions

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. reg aceee envperc enerperc lob demhou demsen gov
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Source	SS	df	MS			
Model	1952.46626	6	325.411044	Number of obs =	47	
Residual	3165.69331	40	79.1423328	F(6, 40) =	4.11	
Total	5118.15957	46	111.264339	Prob > F =	0.0026	
				R-squared =	0.3815	
				Adj R-squared =	0.2887	
				Root MSE =	8.8962	

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
envperc	283.0094	1106.82	0.26	0.799	-1953.958	2519.976
enerperc	-20.77162	30.32165	-0.69	0.497	-82.05395	40.51071
lob	.1662161	.096359	1.72	0.092	-.0285328	.360965
demhou	18.98673	19.10688	0.99	0.326	-19.62972	57.60318
demsen	5.596512	15.07476	0.37	0.712	-24.87071	36.06373
gov	3.577285	3.31424	1.08	0.287	-3.121045	10.27561
_cons	-2.863611	7.477997	-0.38	0.704	-17.97721	12.24998

Table 9 2010, Energy and Environment Contributions

. reg aceee envperc enerperc Tob demhou demsen gov

Source	SS	df	MS			
Model	2451.47676	6	408.579459	Number of obs =	46	
Residual	2914.17542	39	74.7224466	F(6, 39) =	5.47	
Total	5365.65217	45	119.236715	Prob > F =	0.0003	
				R-squared =	0.4569	
				Adj R-squared =	0.3733	
				Root MSE =	8.6442	

aceee	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
envperc	586.2673	204.7114	2.86	0.007	172.1994	1000.335
enerperc	-34.31727	58.25943	-0.59	0.559	-152.1581	83.52354
Tob	.1277489	.0965934	1.32	0.194	-.0676297	.3231275
demhou	36.36846	18.40503	1.98	0.055	-.8592403	73.59615
demsen	-5.930793	15.39548	-0.39	0.702	-37.07109	25.20951
gov	-.3442618	2.678432	-0.13	0.898	-5.761903	5.073379
_cons	-7.651247	8.282031	-0.92	0.361	-24.40324	9.100741

7. Conclusion

Policy-makers derive utility from social welfare and contributions. Often, this means trading off one for the other. For social issues, the economic literature suggests that policy-makers will place a greater weight on social welfare than contributions, especially when there are polarized interest groups. Environmental policy consists of two competing lobbies, environmental groups and energy groups, who have diametrically opposing ideal policies. Since it is expected that policy-makers will place a high value on social welfare for a social issue such as environmental policy, we expect that environmental contributions should have a greater effect in increasing energy efficiency than energy contributions have in decreasing energy efficiency.

In both the single lobby framework and the competing lobbies framework, the empirical analysis shows that environmental contributions increase energy efficiency scores and energy contributions decrease energy efficiency scores. The magnitude of the influence of environmental contributions is many times greater than the magnitude of the influence of energy contributions which supports the theory. In the competing lobbies framework, an increase in the proportion of environmental contributions by ten percentage points is expected to increase the energy efficiency score by between 27.8 and 58.6 points whereas an equivalent increase in the

proportion of energy contributions is expected to decrease the energy efficiency score by between 2.0 to 6.3 points. This means that policy-makers have a high weight on social welfare which supports the GH model and the many empirical tests of the GH model on trade protection. Higher measures of lobbying disclosure tend to significantly increase energy efficiency scores. This makes intuitive sense because environmental policy is a very public issue so distortions away from a socially optimal policy are likely to occur in States with little transparency. More Democrats in the House and Senate and a Democratic Governor tend to increase energy efficiency scores. This supports our assumption that Democrats are more likely to promote energy efficiency and helps explain why environmental groups almost exclusively contribute to the Democratic Party. The Governor tends to be the most significant of the three government variables followed by the House. This makes sense because the legislative process begins in the House and ends with the Governor so one would expect policy to be biased towards the ideology of these two levels of government. These results support the theoretical predictions quite well and suggest that policy-makers do value social welfare highly for a social issue such as environmental policy as predicted by Martimort and Semenov (2008).

There is the possibility that the estimates in this model are biased due to reverse causality. Environmental contributions may be higher in States with more energy efficient policies because these States signal that they are more likely to adopt more energy efficient policies. Similarly, energy contributions may be higher in States with less energy efficient policies because these States signal that they do not value energy efficiency highly. This paper merely establishes a positive correlation between environmental contributions and energy efficiency and a negative correlation between energy contributions and energy efficiency. Subsequent research should evaluate more rigorously the causation between contributions and energy efficiency.

Reverse causality may also be used to explain the counter-intuitive results when similar empirical analysis is applied to a purely industrial issue such as business regulation. Regressions were run on business regulation issues such as natural gas unbundling and tobacco regulation (Appendix 5 and 6). Greater amounts of contributions from the affected business lobby lead to higher levels of relevant business regulations to which the lobby group is opposed. There does not seem to be a theoretical explanation for these results in the current literature. The reverse causality explanation implies that business groups will lobby more aggressively in States with

high regulation levels to try to reduce the levels of regulation. Subsequent papers should explore the theoretical and econometric explanations for this finding.

Appendix

Appendix 1 Pro-Environment Contributions by Party

	Donations to Democrats	Donations to Republicans	% to Democrats	% to Republicans
2000	\$991,427	\$113,992	89.7%	10.3%
2001	\$26,840	\$1,000	96.4%	3.6%
2002	\$2,122,188	\$335,255	86.4%	13.6%
2003	\$27,364	\$2,950	90.3%	9.7%
2004	\$1,479,257	\$111,819	93.0%	7.0%
2005	\$141,792	\$2,275	98.4%	1.6%
2006	\$2,337,867	\$362,977	86.6%	13.4%
2007	\$195,133	\$11,164	94.6%	5.4%
2008	\$1,461,492	\$228,930	86.5%	13.5%
2009	\$154,630	\$5,800	96.4%	3.6%
2010	\$1,992,546	\$250,410	88.8%	11.2%
2011	\$188,875	\$10,005	95.0%	5.0%
2012	\$642,737	\$87,158	88.1%	11.9%

Source: National Institute on Money in State Politics

Appendix 2 Energy and Natural Resource Contributions by Party

	Donations to Democrats	Donations to Republicans	% to Democrats	% to Republicans
2000	\$15,516,378	\$22,060,418	41.3%	58.7%
2001	\$1,676,961	\$2,099,128	44.4%	55.6%
2002	\$21,596,259	\$34,973,037	38.2%	61.8%
2003	\$2,719,866	\$3,692,307	42.4%	57.6%
2004	\$15,126,132	\$30,438,642	33.2%	66.8%
2005	\$2,177,797	\$3,532,782	38.1%	61.9%
2006	\$23,321,576	\$48,020,748	32.7%	67.3%
2007	\$2,836,998	\$5,238,050	35.1%	64.9%
2008	\$23,135,503	\$42,245,273	35.4%	64.6%
2009	\$2,656,046	\$4,248,244	38.5%	61.5%
2010	\$31,681,180	\$63,886,128	33.2%	66.8%
2011	\$4,892,954	\$9,209,884	34.7%	65.3%
2012	\$16,559,945	\$34,703,324	32.3%	67.7%

Source: National Institute on Money in State Politics

Appendix 3 Components of Energy and Natural Resources Contributions

Energy and Natural Resources
Aluminum Mining and Processing
Commercial Fishing
Electric Utilities
Environmental Services and Equipment

Fisheries and Wildlife
Hunting
Mining
Miscellaneous Energy
Miscellaneous Energy and Natural Resources
Nuclear Energy
Oil and Gas
Railroads
Smelting and Refining
Steel
Waste Management
Water Utilities
Wise Use

Source: National Institute on Money in State Politics

Appendix 4 ACEEE Scorecard Criteria

Policy Area	Point Allocation	Point Allocation (%)
Utility and Public Benefits Programs	20	40%
Transportation Policies	9	18%
Building Energy Codes	7	14%
State Government Initiatives	7	14%
Combined Heat and Power Policies	5	10%
Appliance and Equipment Standards	2	4%
TOTAL	50	100%

Source: American Council for an Energy-Efficient Economy (2012)

Appendix 5 Deregulation of Natural Gas²

. reg dereggas natgaspercent Tob demhou demsen gov

Source	SS	df	MS			
Model	8.5680143	5	1.71360286	Number of obs = 41		
Residual	22.3100345	35	.637429557	F(5, 35) = 2.69		
Total	30.8780488	40	.77195122	Prob > F = 0.0370		
				R-squared = 0.2775		
				Adj R-squared = 0.1743		
				Root MSE = .79839		

dereggas	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
natgaspercent	41.86589	27.00146	1.55	0.130	-12.94998	96.68176
Tob	-.0118647	.0091654	-1.29	0.204	-.0304714	.006742
demhou	4.695031	1.805423	2.60	0.014	1.029827	8.360235
demsen	-2.994886	1.472744	-2.03	0.050	-5.984717	-.0050562
gov	.3746662	.267765	1.40	0.171	-.1689257	.918258
_cons	.1119281	.6615522	0.17	0.867	-1.231094	1.45495

Appendix 6 Tobacco Regulation³

. reg tobreg tobper Tob demhou demsen gov

Source	SS	df	MS			
Model	.005363958	5	.001072792	Number of obs = 43		
Residual	.012667496	37	.000342365	F(5, 37) = 3.13		
Total	.018031454	42	.00042932	Prob > F = 0.0186		
				R-squared = 0.2975		
				Adj R-squared = 0.2025		
				Root MSE = .0185		

tobreg	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
tobper	.5770233	.9642273	0.60	0.553	-1.376687	2.530733
Tob	.0001154	.0002057	0.56	0.578	-.0003015	.0005322
demhou	-.0482904	.0400125	-1.21	0.235	-.1293635	.0327827
demsen	-.0233587	.0333321	-0.70	0.488	-.0908959	.0441785
gov	.0002686	.0059362	0.05	0.964	-.0117593	.0122964
_cons	.022466	.0164806	1.36	0.181	-.010927	.0558589

² The independent variable is equal to 0 if no unbundling has taken place in the retail sales of natural gas, 1 if there is partial unbundling, and 2 if there is full unbundling. The regression results show that natural gas contributions are positively correlated with higher levels of unbundling.

³ The independent variable is an index of tobacco regulation on sales and use. The regression shows that tobacco contributions are positively correlated with tobacco regulation.

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