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ENDOGENOUS COST LOBBYING WITH RETROSPECTIVE VOTERS: THEORY AND EVIDENCE

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ABSTRACT

This paper examines the timing and intensity of interest group lobbying. It takes an informational model of endogenous lobbying costs and incorporates retrospective voting by the electorate. The model is then tested using data on university lobbying for academic earmarks. The paper finds support for two main theoretical and empirical results. First, the lower the level of legislator effort required to pass a bill, the lower the level of interest group lobbying. This suggests that powerful legislators will receive less lobbying from like-minded constituents than will less powerful legislators. Second, as the election becomes more proximate in time, the legislator is willing to exert more effort for a given level of lobbying. Thus, interest groups will exert less effort in lobbying in election years. We are currently working on refining and extending our analysis. These results are preliminary and incomplete.

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I. INTRODUCTION

Legislators rely on information about proposals to decide which types of policy to back. Lobbying by interest groups is one of the major sources of this information. Lobbying is the direct and private transfer of information to legislators by groups and individuals, and as such excludes the provision of campaign contributions or other resources by interest groups to legislators. In the United States, lobbying expenditures approach $2 billion annually, which is more than three times the amount of annual campaign contributions given by PACs (Groseclose *et al* 2000).

The typical theoretical model on informational lobbying examines the ideal points (and bias) of legislators and interest groups under various states of nature, and assumes some kind of optimal policy to match each state of nature. Endogenous cost models of lobbying demonstrate that the investments in lobbying can be used by the biased interest group to credibly signal the true state of nature to the legislator, and thus result in good policy outcomes for the legislator (see for example, Grossman and Helpman 2001). These types of models, however, do not consider the timing of the optimal interest group activity.[1] Given legislators usually serve over multiple years, interest groups want to time their activity to the point in time that its information will have the highest probability of affecting policy outcomes. This then means that the legislators will be more responsive to information at some times relative to others (Kingdon 1996). In this paper, we examine not only what affects the intensity of lobbying (as in previous models), but also what affects the timing of lobbying.

[1] These models typically do not consider variation among legislators in the cost of enacting a particular policy. In this paper, we examine how such variation affects the intensity of lobbying.

To explore these questions we introduce voters into the mix. In particular, we integrate elements of retrospective voter theory (Fiorina 1981; Muthoo and Shepsle 2003) into a model of informational lobbying with endogenous lobbying costs (Grossman and Helpman 2001) to generate predictions about when interest groups are likely to lobby, and what legislator or constituency characteristics are likely to elicit more intense lobbying. Retrospective voter theory has a long tradition in political science, stretching back to Downs (1956), Key (1966), and Jackson (1975). Recent studies of the electorate have confirmed that voters vote retrospectively to a large extent (CITES to the National Election Study papers). These papers show that voters examine what the politician has done over her last term, weighting recent policy outcomes more heavily than those far in the past, and then determine whether to vote for the incumbent. By incorporating the time dimension of retrospective voters into a model, we can generate and test predictions for the timing of interest group investments in lobbying.

This study is somewhat related to, but different from, prior research that explores the determinants of resource transfers and campaign contributions (Grossman and Helpman 1994). One key result from this literature is that, to achieve a particular policy, an interest group aligned with key agenda-setters in the legislature will provide lower campaign contributions than will interest groups aligned with less central legislators (Helpman & Persson 2001). More broadly, an interest group affiliated with a legislator who incurs a higher cost to deliver a policy will need to provide greater campaign contributions to obtain that policy than will an interest group affiliated with a "low-cost" legislator (Denzau & Munger 1986; Thomas Stratmann 1996).[2] This occurs because, as a

[2] The cost to a legislator of delivering policy may vary due to differences in the legislator's control over the agenda (Helpman & Persson 2001), differences in constituent preferences (Stratmann 1996), etc.

legislator faces increased costs to enacting a policy, she will require increased contributions to offset these costs. A second key result from the resource transfer literature is that an interest group typically gives contributions around the time of key votes on issues of interest it, and as an election approaches (Grossman & Helpman 1996; Stratmann 1995). This literature thus suggests that campaign contribution activity is timed so as to purchase the votes of legislators, and to influence electoral outcomes in ways that favor the interest group (Stratmann 1998). The implications of these studies for informational lobbying are unclear. Unlike information, campaign contributions provide benefits beyond the specific policy in question; in the above studies, the point of campaign contributions is to provide a legislator with resources with which to obscure the fact that she has not voted in accordance with her constituent's desires on a particular policy. Information about a specific policy is less fungible, and can not be used by the legislator in such general ways in subsequent election campaigns.

In the realm of informational lobbying, there are only two prior studies of which we are aware that address questions of timing and intensity of interest group activity. The first, already discussed, is a paper by Grossman and Helpman (2001) who introduce a model of lobbying with endogenous costs. A key result of this model is that an interest group with a greater "bias" – defined as deviation in its ideal point from that of the legislator – will need to incur higher lobbying costs to credibly convey information about a given state of the world than will an interest group with a smaller bias. The second by de Figueiredo (2004) explores empirically the timing and intensity of lobbying activity at the state level, by exploiting variation across states in the timing of election cycles and of budget deliberations. A key result of this study is that interest groups time their lobbying

activity to coincide with key "policy windows" around votes of particular interest to them. This study finds that lobbying activity does not increase as election time nears.

Our paper builds on these prior studies by introducing a formal model that includes endogenous lobbying costs, variation across legislators in their cost of delivering policy, and timing of elections. We take the Grossman-Helpman (2001) model and add legislators with varying costs, and retrospective voters. With this, we are able to generate two predictions: 1) an interest group whose legislator incurs higher cost to deliver a policy will spend more on informational lobbying than an interest group whose legislator incurs lower cost to deliver that policy; and 2) an interest group whose legislator faces an impending election, and who therefore is keen to deliver favorable policy to her constituents, will spend less on informational lobbying than an interest group whose legislator does not face an impending election. [Note: we are working on two additional propositions as well, but they are not quite ready at this time.]

We then examine these propositions empirically in a study of lobbying by universities to obtain "earmarked" grants. Earmarked grants, or earmarks, are non-competitive grants written into appropriations bills by legislators to award funds to specific universities and colleges, thus bypassing the competitive peer-review process (Amy Finkelstein, 1995). University lobbying for earmarked grants offers a particularly appealing testbed for research on lobbying activity because the setting overcomes several empirical challenges to such research (John de Figueiredo and Brian Silverman 2004). Because in any given electoral cycle only one-third of all Senators are up for election, we use the staggered Senatorial elections as an identification strategy to help measure the impact of elections on university lobbying. We find support for both predictions of the

theory. Moreover, we find that certain types of universities alter their behavior particularly dramatically in response to their representatives being in positions of power and/or up for election.

The paper proceeds as follows. The next section develops a model of lobbying with endogenous costs in the presence of retrospective voters. Section III provides background to the empirical work. Section IV provides the empirical evidence. We conclude in Section V.

II. THEORY

The model builds from a set-up developed by Grossman and Helpman (2001). Theirs is a one-period model with two actors, the legislator L and the special interest group SIG. The legislator's cost to deliver a policy is not considered. Our model has three actors: voters, the legislator L, and the special interest group SIG. Voters are assumed to vote retrospectively based on the policies that legislator L delivers. For convenience, their actions are otherwise excluded from the model. The legislator acts to maximize her re-election chances, which includes choosing policies that appeal to constituents. A legislator can be high-cost or low-cost, which broadly reflects her power to enact the desired policy. There are two periods, $t = 0$, in which the legislator does not face an election, and $t = 1$, in which she does so. The action in the model centers on the choice of a particular policy of value to the interest group. The interest group chooses its level and timing of lobbying activity to influence the legislator concerning this policy choice, given the state of the world. The interest group knows the true state of the world, but the legislator does not.

Although the model is too preliminary to lay out in its complete form, here are the objective functions of the legislator and the interest group:

States of nature: θ_{Low}, θ_{High} $\quad$ $Prob(\theta_{Low}) = Prob(\theta_{High}) = ½$

Possible policies: p_{Low}, p_{High}

L's objective function: $G(p, \theta, P, E, \lambda, t) = B_L(p, \theta, \lambda, t) - C_L(p, P, E)$ where

- θ represents the state of the world
- p represents the policy that is enacted
- P represents the Power of the legislator
- E indicates whether the legislator faces an election
- $0 < \lambda < 1$ represents the "discount rate" for obtaining p in period t = 0 vs. t = 1 due to retrospective voting behavior.
- t represents the period, 0 or 1, where an election occurs at the end of period 1
- B(.) represents the benefit to the legislator of policy p;
- C(.) represents the cost to the legislator of spending effort to obtain policy p;
- C is increasing in p, decreasing in P, and maybe increasing in E (if there is "congestion" in obtaining policy during an election year).

Crudely speaking, this objective function takes a form along the lines of:[3]

$$G(p, \theta, P, E, \lambda, t) = \lambda^{(1-t)}[A - (p - \theta)^2] - c\theta/P - c\theta E$$

where A is some positive scalar. The legislator prefers to choose the high policy, p_{High}, if the state of nature is θ_{High}, and the low policy p_{Low} if the state of nature is θ_{Low}. In the absence of any information, the legislator will split the difference and choose a policy halfway in between the low and high policy, $p_{no\_info} = \max p(E(\theta)) = (p_{High} + p_{Low})/2$.

SIG's objective function: $U(p, \theta, \delta, \lambda) = B_{SIG}(p, \theta, \delta, \lambda) - C_{SIG}(l)$ where

- p, θ, P, and λ are defined as before
- $\delta > 0$ represents the known bias in SIG's preferences
- *l* represents the amount that SIG spends in lobbying expenditures
- B(.) represents the benefit to the SIG of policy p;
- C(.) represents the cost to the SIG of lobbying for this policy;
- C is increasing in *l*.

Crudely speaking, this objective function takes a form along the lines of:[4]

$$U(p, \theta, \delta, \lambda) = \lambda^t[M - (p - \theta - \delta)^2] - l$$

[3] By way of comparison, the objective function in Grossman & Helpman is $G(p, \theta) = -(p - \theta)^2$

[4] By way of comparison, the objective function in Grossman & Helpman is $U(p, \theta) = -(p - \theta - \delta)^2 - l$

where M is some positive scalar, and δ is sufficiently high that the SIG would prefer p_{high} to p_{low} regardless of θ.

Abstracting from the details, this model generates several results. First, to reiterate Grossman & Helpman's (2001) key finding, when the SIG can choose any level of lobbying expenditure, there always exists an amount of lobbying expenditure that will credibly convey the true state of the world (and that the SIG is willing to pay), regardless of how large is the SIG's bias δ. This occurs because the SIG can credibly demonstrate that $\theta = \theta_{high}$ by "burning" money that it would only prefer to burn to get policy p_{high} if $\theta = \theta_{high}$. Second, the higher is L's cost to deliver the policy, the greater lobbying expenditure SIG must make to motivate L to deliver this policy. This is because the threshold condition for the legislator to be convinced to exert effort is lower. That is, less lobbying is required to induce the legislator to exert effort because the amount of effort required by the legislator is smaller to deliver the policy. Since cost is decreasing in L's power, this means that the more (less) powerful is L, the less (more) SIG will spend on lobbying. This is proposition 1 below. Third, since L gets greater benefit from delivering policy p when t = 1 than when t = 0 (in other words, closer to the election), SIG will have to expend less to lobby in period t = 1. L gets greater benefit from delivering policy closer to the election because retrospective voters value this policy more than they value a policy that was delivered earlier. This effect will be greater, the smaller is λ, since a smaller λ corresponds with steeper discounting over time by voters.[5] This is proposition 2 below.

[5] We currently have the discount rate for both the legislator and interest group to be the same. We are in the process of relaxing this assumption.

Fourth, if it is more costly to L to deliver policy during an election year ($dC/dE > 0$), then this will increase the amount that SIG must spend on lobbying in $t = 1$. Fifth, if L can only deliver the policy once, L's preference for when to deliver the policy will depend on the tradeoff between how steeply voters discount earlier delivery, λ, and differences in the cost of enacting policy during election years, $c\theta E$. At the same time, the SIG's preference for when to obtain the policy will depend on the tradeoff between the discount rate associated with getting the policy (for the SIG, earlier is better), λ, and differences in the amount of lobbying expenditure needed to obtain the policy in $t = 0$ or $t = 1$ – differences that depend on L's objective function.

Thus this model yields two propositions that are tested in this paper, and two or three others on which we continue to work using the results from the previous paragraph:

Proposition 1: An interest group will spend less on lobbying the more powerful is the legislator that it lobbies, thanks to the lower cost that the legislator must exert to deliver the policy.

Proposition 2: An interest group will spend less on lobbying in election years, thanks to the higher willingness of a representative to exert effort to pass legislation that benefits her district in election years.

In the remainder of the paper, we examine the statistically the validity of these propositions using a database on university lobbying for academic earmarks.

III. BACKGROUND

Universities obtain their academic funding from the government through two main mechanisms. The first, and the one with which most academics are familiar with, is the competitive grant system. Under this system, the awarding of funds is managed by a

central agency (e.g. National Science Foundation, National Institutes of Health, Department of Defense, Department of Energy) and several other federal agencies, and awards are made primarily on the basis of peer review or other competitive granting process of project proposals.

A second mechanism through which universities obtain federal funding is through academic earmarks. Earmarks, which are non-competitive grants written into appropriations bills by legislators, allocate money directly to projects at specific universities and colleges, thus bypassing the competitive peer-review process (Amy Finkelstein, 1995). The amount of money allocated through academic earmarks rose from less than $17 million in 1980 ($32 million in constant 2001 dollars) to nearly $1.7 billion in 2001, a 100-fold increase in nominal terms (52-fold increase in real terms). By 2001 academic earmarks represented nearly 10 percent of total federal funding of academic research. This is just one mechanism legislators have to send money to their districts.

When firms seek these earmark grants, they lobby legislators. That is, they hold meetings with legislators and their staffers to discuss the possibility of obtaining these grants for their university. Note that because most universities are non-profit institutions, they are legally prohibited from using PAC contributions or grassroots political organization to convey their preferences to legislators; lobbying is their primary option. To this extent, lobbying by universities is the primary mechanism by which these institutions seek to obtain specific favors and grants.

The rise of specialist lobbying firms to secure earmarks has also routinized the earmark "production schedule." The "life cycle" of lobbying and obtaining an earmark is

as follows.[6] In January, a university's administrators meet with its lobbyist to formulate their lobbying strategy for the upcoming fiscal year. This entails prioritizing potential earmark requests by the likelihood of success, and identifying elected officials to lobby. In most cases, the lobbyist will approach the Representative and/or Senator from the university's district. Beginning in March and April, the university begins lobbying the targeted representatives to have its request included in the appropriations legislation. After the August recess, there is a large push to have the request included in one of the 13 appropriations bills. The cycle ends in November or December, as the appropriations bills are sent to the President, and in January the process begins again. According to our interviewees, requests from one year do not carry forward to the next year. This is mainly because the appropriations process, unlike the budget process, is not a multiyear process.

IV. EMPIRICAL EVIDENCE

A. THE DATA

The dependent variable in the statistical analysis is the amount of money an academic institution of higher learning spends on lobbying (taken by the fourth root).[7] We have obtained the 1997-1999 data from disclosures made by institutions in compliance with the Lobbying Disclosure Act of 1995. This legislation mandates that any individual who spends more than 20 percent of his or her time lobbying administrative agencies, Congress, or the Executive, must file a report disclosing the amount of money expended on this activity. Each organization that spends more than $20,000 on such lobbying in a given year also must file a report disclosing the name of

[6] According to interviews with staffers on the appropriations committees and lobbyists.
[7] We use the fourth root because it approximates the natural logarithm, but is defined at zero. This enables us to retain the many observations for universities that spend zero on lobbying in a given year.

the lobbyist, the clients of the lobbyist, and the amount of money spent on lobbying by the client (to the nearest $20,000).[8] Table 1 provides a list of the top lobbying universities during this time period.

We include three sets of independent variables. Table 2 presents definitions of all the variables with all of their sources. The first set of data employed is a set of characteristics for each university's Congressperson and Senator in each year from 1997 to 1999. We obtain this by mapping each institution into its congressional district based on nine-digit zip codes. Then, we include the Representative's ADA score, the two Senators' mean ADA score, dummy variables for appropriations committee assignments, whether the Senator is up for election, the closeness of that election (if the Senator is up), and dummy variables for chairmen and ranking members. We also match the legislators with their alma maters, to test for any effect on the outcomes of earmarking (A. Abigail Payne and Aloysius Siow 2003).

A second set of data is a set of characteristics for each university's district. We include data on age and median income of individuals in the district. These data come from the Bureau of the Census, which maps the results of the Census into congressional districts.

A final set of data includes characteristics for each university. To control for university quality, we employ the National Academy of Science (NAS) university rankings. Every 10 years, the NAS ranks 41 different departments at all research universities on their research quality. Each department is given an ordinal ranking

[8] This report encompasses all expenses related to lobbying, including the cost of cultivating lobbying contacts and background work that is intended for use in contacts and coordination with the lobbying activities of others (Office of the Clerk of the House, 2001). This includes salaries and benefits, overhead, expenses, and third-party billings.

relative to all other schools.[9] For all other university characteristics, we employ the Integrated Postsecondary Education Data System (IPEDS). Each year, the Department of Education certifies post-secondary institutions that are eligible for Title IV (subsidized federal financial aid) funds. We control for whether an institution is public, has a medical school, has a Ph.D. program, or has athletic aid scholarships. We also control for student enrollment. We use as the sample frame for our study all 2,382 domestic, non-profit, Carnegie Foundation recognized institutions for which there is complete IPEDS data.[10] We also obtained each university's overhead rate from the Division of Cost Allocation of the Office of Grants Management of the Department of Health of Human Services (HHS).[11] Universities usually sign global agreements to cover research funded by the federal government for a specified overhead rate for a given year. HHS collects all of these indirect cost contracts in the only comprehensive, centralized database of overhead rates of which we are aware. We obtained the contracts from HHS and have taken the relevant overhead rate in April of the year of interest. de Figueiredo and Silverman (2002) have shown that this variable is an important predictor of lobbying expenditures by universities.

Table 3 presents the descriptive statistics of our 7,146 university-year observations. The average annual lobbying expenditures for all of these institutions is

[9] We use an ordinal ranking system for the university. The results are robust to a variety of different ranking systems, including the use a departmental ranking system.
[10] IPEDS includes more than 6,400 post-secondary institutions that qualify under Title IV. Many of these are vocational schools, such as Bjorn's Hairstyling Academy in Vallejo, CA, that are unlikely to be "at risk" for receiving earmarks. We eliminate such institutions by excluding those not covered by the Carnegie Foundation.
[11] Special thanks to Charles Seed and Otto Kent for assistance with the data. In most cases, we use the on-campus research rate for the main campus. For universities without such a rate, we used the closest category available.

$7,442; if we limit it to only those observations where a university lobbies, the average lobbying expenditure is $125,726.

B. OPERATIONALIZING THE PROPOSITIONS AND METHOD

The theory section provides two propositions that are derived from the theory. [Note: We are currently working on operationalizing the remaining propositions that we are developing in the theory section.] The first proposition claims that lobbying will decrease if a group is represented by legislator who is able to engage in less effort for the same policy. In this section, we claim that representatives who marginal productivity is highest for any given level of effort are those representatives who sit on the congressional committees that oversee the allocation of funds in higher education. These committees are the appropriations committees and the science committees in each of the Congressional chambers. Thus, we expect that the coefficients on these committee variables for any given university will be negative and statistically significant if this proposition holds.

The second proposition claims that in election years, the higher willingness of a representative to exert effort to pass legislation that benefits his district leads to lower lobbying. The raises an econometric identification issue. If we run a regression with the election on the right hand side, all House members will be up for election every year. And we will not be able to separately identify the electoral effect. However, in any given year, there is variation in the Senate. Only 1/3 of the Senate (approximately 33 senators) are up for election in a given year. Thus, we can use the staggered Senatorial elections to identify the election effect. We do just this with our variable of Election Year Senate.

This variable is equal to one only if the state has a Senator who is up for election in any given year, and is equal to zero otherwise. If an increased willingness to exert effort by the Senator leads to less lobbying, the coefficient on this variable should be negative and statistically significant.

To verify the validity of these propositions, we use a tobit model with standard errors clustered around each university. A tobit is useful in this estimation because many institutions have zero lobbying. Clustering is useful to account for the effect that potential non-independence of observations will have on the estimated standard errors.

C.. RESULTS

Table 4 presents the results. Model 1 presents only the control variables. Model 2 presents only the theoretical variables of interest. Model 3 presents the full model. Models 4-6 repeat the previous three models excluding Ph.D. granting institutions. The table presents the estimated coefficients with the standard errors below in parentheses (clustered on institution). Statistical significance of the coefficients at the 90%, 95%, and 99% level of confidence is indicated. A log likelihood ratio tests indicates that the Model 3 adds additional explanatory power relative to Model 1 at the 95% level of confidence.

We begin by discussing the control variables. As found in previous studies (de Figueiredo and Silverman 2002), the coefficient on overhead rates is positive and statistically significant at the 99% level of confidence. School characteristics also prove to be quite important in determining the level of university lobbying. Top ranked schools, schools with Ph.D. programs, and universities with large enrollments are more

likely to spend more money lobbying, while public institutions spend less on lobbying. All of these variables have statistically significant coefficients.

We now turn to the coefficients on the variables that are tied to our proposition. The first proposition predicted that those universities that are represented by members on the Science and Appropriations Committees, those committees with purse-string control relevant to universities, would lobby less. We find the effect for Senatorial committees, but not for House committees. Having representation on the Senate Science Committee and Senate Appropriations Committee reduces the amount of lobbying universities engage at the 90% level of confidence.

The second proposition holds that in time periods when there are elections, there is likely to be less lobbying. We are able to identify the effect of lobbying through the staggered Senatorial elections. The coefficient on Election Year in Senate is negative as expected at statistically significant at the 95% level of confidence.

We include a control variable that measures the closeness of the current election if a Senator is up for election. We find that the closer the election, the more lobbying that occurs. Overall, we find support for both of the propositions.

It has been suggested that top universities are different that other higher education institutions. First, because so much of their mission is research, their utility function is quite different from other types of institutions. Second, these institutions, when they lobby, are not only lobbying for private goods (such as specific funding for the university), but also for public goods (such as tax breaks for all institutions of higher

education). To address this critique, we have re-run the models omitting Carnegie I ranked institutions. These results are presented in Models 4 through 6.[12]

All coefficients on the theoretical variables have the same sign as the previous models, and in almost all cases the statistical significance is the same. What is quite different is the magnitude of the coefficients on these variables. These coefficients tend to be larger, sometimes up to twice the size, relative to the previous models. Because of the fourth root transformation of the dependent variable, this means that differences in effect can be quite large.

In Table 5, we quantify some of the effects. We examine the mean levels of spending on lobbying by a university with representation and without; and whose representative is facing and election and not. If we index the university that does not have representation and does not have a senator up for election at 100, we can then ask how the lobbying expenditures differ based on representation and senatorial elections. The top table provides the results for all universities; the lower table provides results for non-Carnegie I institutions.

While in both cases elections and representation results in less lobbying, the magnitudes are in the 2-6% range for the top tier universities, while they are in the 18-49% range for non-Carnegie I institutions. Likewise, each percentage point difference in electoral margin results in 1% more lobbying by universities in the full sample, and 11% more lobbying in the non-Carnegie I sub-sample, relative to the mean levels of lobbying. Thus, while the direction of the effects are the same in both sample frames, they are more

[12] A model excluding the outliers of Northwestern University and Boston University yields results nearly identical to those presented in Model 3.

pronounced in less research oriented institutions.

V. CONCLUSION

This paper has integrated the main assumptions of retrospective voting into a model of lobbying with endogenous costs. In doing this, it has developed both cross-sectional and time series implications for the way in which interest groups engage in lobbying. The model created two main predictions. First, the interest groups who are aligned with their representatives will invest less in lobbying the more powerful the representative is. Second, as elections draw near, interest groups will invest less in lobbying, because legislators will have an increasing willingness to engage in effort to pass policies to capture retrospective voters.

We find evidence for this in an examination of university lobbying for academic earmarks. To identify the effects of elections, we use staggered Senatorial elections in various states. We find that both propositions find support in the data. In particular, universities that are represented by legislators who sit on the Senate Science and Senate Appropriations Committees lobby less. In addition, universities lobby less in election years. These effects are more pronounced for universities that are not Carnegie I institutions. This may be because the Carnegie I institutions are lobbying for both particularized and collective goods.

Moving forward, we are in the process of developing additional propositions from the theory and further testing them in the dataset.

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TABLE 1: TOP LOBBYING UNIVERSITIES

INSTITUTION	YEAR	LOBBYING EXPENDITURES
BOSTON_UNIVERSITY	1997	$760,000
BOSTON_UNIVERSITY	1998	$760,000
BOSTON_UNIVERSITY	1999	$760,000
NORTHWESTERN_UNIVERSITY	1999	$740,000
NORTHWESTERN_UNIVERSITY	1997	$736,355
NORTHWESTERN_UNIVERSITY	1998	$580,000
UNIVERSITY_OF_MIAMI	1999	$520,000
WAKE_FOREST_UNIVERSITY	1999	$520,000
JOHNS_HOPKINS_UNIVERSITY	1999	$490,000
HARVARD_UNIVERSITY	1998	$480,000
JOHNS_HOPKINS_UNIVERSITY	1997	$480,000
TULANE_UNIVERSITY_OF_LOUISIANA	1999	$480,000
HARVARD_UNIVERSITY	1997	$460,000
HARVARD_UNIVERSITY	1999	$460,000
UNIVERSITY_OF_MIAMI	1998	$460,000
NEW_YORK_UNIVERSITY	1999	$440,000
UNIVERSITY_OF_MASSACHUSETTS-AMHERST	1997	$415,000
JOHNS_HOPKINS_UNIVERSITY	1998	$400,000
NEW_YORK_UNIVERSITY	1997	$400,000
TEMPLE_UNIVERSITY	1999	$400,000
TUFTS_UNIVERSITY	1997	$400,000
UNIVERSITY_OF_MICHIGAN-ANN_ARBOR	1998	$400,000
NEW_YORK_UNIVERSITY	1998	$380,000
TUFTS_UNIVERSITY	1998	$380,000
UNIVERSITY_OF_MIAMI	1997	$380,000
YALE_UNIVERSITY	1998	$380,000
UNIVERSITY_OF_MICHIGAN-ANN_ARBOR	1999	$360,000
UNIVERSITY_OF_PENNSYLVANIA	1997	$360,000
UNIVERSITY_OF_PENNSYLVANIA	1998	$360,000
UNIVERSITY_OF_PENNSYLVANIA	1999	$360,000
BOSTON_COLLEGE	1998	$320,000
TUFTS_UNIVERSITY	1999	$320,000
YALE_UNIVERSITY	1999	$320,000
YALE_UNIVERSITY	1997	$318,114
MASSACHUSETTS_INSTITUTE_OF_TECHNOLOGY	1998	$310,743
MASSACHUSETTS_INSTITUTE_OF_TECHNOLOGY	1997	$309,131
ROCHESTER_INSTITUTE_OF_TECHNOLOGY	1997	$300,000
THE_UNIVERSITY_OF_TEXAS_AT_AUSTIN	1997	$300,000
UNIVERSITY_OF_UTAH	1998	$290,000
STANFORD_UNIVERSITY	1998	$280,000
MASSACHUSETTS_INSTITUTE_OF_TECHNOLOGY	1999	$270,702
THE_UNIVERSITY_OF_TEXAS_AT_AUSTIN	1999	$265,000
UNIVERSITY_OF_NEW_ORLEANS	1999	$260,000
GOLDEN_GATE_UNIVERSITY-SAN_FRANCISCO	1997	$240,000
GOLDEN_GATE_UNIVERSITY-SAN_FRANCISCO	1998	$240,000
NEW_JERSEY_INSTITUTE_OF_TECHNOLOGY	1998	$240,000
ROCHESTER_INSTITUTE_OF_TECHNOLOGY	1998	$240,000
ROCHESTER_INSTITUTE_OF_TECHNOLOGY	1999	$240,000
STANFORD_UNIVERSITY	1999	$240,000
TEXAS_TECH_UNIVERSITY	1999	$240,000
UNIVERSITY_OF_CHICAGO	1998	$240,000
UNIVERSITY_OF_UTAH	1997	$240,000
NEW_JERSEY_INSTITUTE_OF_TECHNOLOGY	1997	$220,000
NEW_JERSEY_INSTITUTE_OF_TECHNOLOGY	1999	$220,000
STANFORD_UNIVERSITY	1997	$220,000
TULANE_UNIVERSITY_OF_LOUISIANA	1997	$220,000
TULANE_UNIVERSITY_OF_LOUISIANA	1998	$220,000
UNIVERSITY_OF_MASSACHUSETTS-AMHERST	1998	$220,000
UNIVERSITY_OF_MICHIGAN-ANN_ARBOR	1997	$220,000
SYRACUSE_UNIVERSITY	1998	$213,000
UNIVERSITY_OF_NEVADA-RENO	1997	$202,500
ALFRED_UNIVERSITY	1998	$200,000
ALFRED_UNIVERSITY	1999	$200,000
BUENA_VISTA_UNIVERSITY	1997	$200,000
DREXEL_UNIVERSITY	1997	$200,000
EMBRY_RIDDLE_AERONAUTICAL_UNIVERSITY	1998	$200,000
LORAIN_COUNTY_COMMUNITY_COLLEGE	1998	$200,000
LORAIN_COUNTY_COMMUNITY_COLLEGE	1999	$200,000
MONROE_COMMUNITY_COLLEGE	1999	$200,000
PEIRCE_COLLEGE	1999	$200,000
PHILADELPHIA_UNIVERSITY	1999	$200,000
SAN_DIEGO_STATE_UNIVERSITY	1999	$200,000
STEVENS_INSTITUTE_OF_TECHNOLOGY	1999	$200,000

TABLE 2: VARIABLE DEFINITIONS (AND SOURCE)

Variable Name	Definition
HAC Representation	=1 if House Appropriations Committee Representation; 0 otherwise (Congressional Quarterly)
SAC Representation	=1 if Senate Appropriations Committee Representation; 0 otherwise (Congressional Quarterly)
HSC Representation	=1 if House Science Committee Representation; 0 otherwise (Congressional Quarterly)
SSC Representation	=1 if Senate Science Committee Representation; 0 otherwise (Congressional Quarterly)
Election Year Senate	=1 if the university has a Senator up for re-election; = 0 otherwise
Closeness of Election	the margin between the winner and loser of the election (.05 = 5%) (Professor James Snyder)
Ln(Overhead Rate)	university government overhead rate for on-campus research in April of focal year (HHS)
Top Ranked School	number of departments ranked in the top twenty (National Academy of Science)
18-30 Yr Old Population	number of people in the congressional district between the age of 18 and 30 (Census)
Median Income	median income of the congressional district (Census)
Ph.D. Granting Institution	= 1 if the university grants Ph.D.s; 0 otherwise (IPEDS)
Public University	=1 if the university is a public institution; 0 otherwise (IPEDS)
Medical School	=1 if the university has a medical school; 0 otherwise (IPEDS)
Athletic Aid	=1 if the university offers athletic aid; 0 otherwise (IPEDS)
House Chair/Ranking Member	=1 if university representated by a chair or ranking member on any House committee; 0 otherwise (Congressional Quarterly)
Senate Chair/Ranking Member	=1 if university representated by a chair or ranking member on any Senate committee; 0 otherwise (Congressional Quarterly)
House ADA Score	Representative ADA score (ADA)
Senate ADA Score	Senators' mean ADA score (ADA)
Alumni in House	=1 if university has an alumus or alumna in the House; 0 otherwise (James Snyder)
Alumni in Senate	=1 if university has an alumus or alumna in the Senate; 0 otherwise (James Snyder)
Ln(Enrollment)	Log of the enrollment in the university (IPEDS)

TABLE 3: DESCRIPTIVE STATISTICS

	Mean	Std. Dev	Min	Max
HAC Representation	0.14	0.35	0.00	1.00
SAC Representation	0.52	0.50	0.00	1.00
HSC Representation	0.10	0.30	0.00	1.00
SSC Representation	0.33	0.47	0.00	1.00
Election Year Senate	0.24	0.43	0.00	1.00
Closeness of Election	0.07	0.16	0.00	1.50
Overhead Rate	22.13	20.95	8.00	85.00
Top Ranked School	0.31	2.43	0.00	39.00
18-30 Yr Old Population	0.19	0.02	0.13	0.33
Median Income	29.19	7.66	15.06	57.22
Ph.D. Granting Institution	0.15	0.36	0.00	1.00
Public University	0.59	0.49	0.00	1.00
Medical School	0.04	0.20	0.00	1.00
Athletic Aid	0.50	0.50	0.00	1.00
House Chair/Ranking Member	0.08	0.27	0.00	1.00
Senate Chair/Ranking Member	0.51	0.50	0.00	1.00
House ADA Score	46.53	39.08	0.00	100.00
Senate ADA Score	47.27	33.88	0.00	100.00
Alumni in House	0.12	0.32	0.00	1.00
Alumni in Senate	0.03	0.18	0.00	1.00
Enrollment	5489.00	6678.00	17.00	51445.00

TABLE 4: THE TIMING OF LOBBYING
Dependent Variable: Fourth Root of Lobbying Expenditures

	Model 1 Full Sample; Controls	Model 2 Full Sample; Theory Variables	Model 3 Full Sample; Full Model	Model 4 No Carnegie I; Controls	Model 5 No Carnegie I; Theory Variables	Model 6 No Carneige I Sample; Full Model
HAC Representation		-0.245	-0.601		-4.514	-4.127
		(3.290)	(2.395)		(5.306)	(4.873)
SAC Representation		-5.548**	-3.322*		-8.107**	-6.994*
		(2.469)	(1.976)		(3.950)	(3.610)
HSC Representation		-0.423	-1.587		-8.751	-7.225
		(4.036)	(2.912)		(7.297)	(6.072)
SSC Representation		-4.172	-4.032*		-8.953*	-8.715*
		(2.698)	(2.171)		(4.596)	(4.438)
Election Year Senate		-5.511***	-3.565**		-6.048*	-4.648
		(2.014)	(1.665)		(3.334)	(3.273)
Closeness of Election		17.672***	9.725**		17.167**	12.790
		(5.244)	(3.954)		(8.175)	(7.914)
Ln(Overhead Rate)	4.310***	19.109***	4.322***	6.035***	12.965***	5.951***
	(1.253)	(1.180)	(1.249)	(1.928)	(1.896)	(1.908)
Top Ranked School	0.368**		0.385**	-52.135***		-51.526***
	(0.181)		(0.183)	(6.087)		(5.980)
18-30 Yr Old Population	-32.311		-23.672	-151.801*		-142.569*
	(38.287)		(39.323)	(85.470)		(86.019)
Median Income	-0.449***		-0.427***	-0.472*		-0.430
	(0.154)		(0.151)	(0.272)		(0.265)
Ph.D. Granting Institution	15.534***		15.646***	18.865***		19.322***
	(2.715)		(2.699)	(4.948)		(4.854)
Public University	-16.662***		-15.569***	-27.240***		-24.886***
	(3.169)		(3.098)	(6.016)		(5.717)
Medical School	7.242**		7.236**	-8.208		-8.641
	(2.947)		(2.971)	(13.109)		(12.893)
Athletic Aid	3.582		3.570	2.971		2.989
	(2.205)		(2.211)	(3.685)		(3.679)
House Chair/Ranking Member	-7.840		-7.728	-2.077		-2.407
	(5.208)		(5.160)	(6.326)		(6.285)
Senate Chair/Ranking Member	0.935		0.497	2.988		2.401
	(1.880)		(1.895)	(3.591)		(3.477)
House ADA Score	0.019		0.024	0.072		0.081
	(0.028)		(0.028)	(0.054)		(0.053)
Senate ADA Score	0.063**		0.041	0.051		0.001
	(0.031)		(0.032)	(0.058)		(0.061)
Alumni in House	-2.520		-2.257	-13.387**		-12.743**
	(2.379)		(2.363)	(5.909)		(5.839)
Alumni in Senate	4.362		4.606	-6.688		-5.346
	(2.824)		(2.838)	(13.335)		(13.873)
Ln(Enrollment)	12.417***		11.871***	17.625***		16.749***
	(1.918)		(1.875)	(3.368)		(3.226)
Constant	-137.619***	-102.497***	-131.592***	-180.575***	-102.864***	-166.956***
	(14.110)	(4.792)	(14.165)	(26.158)	(6.791)	(25.849)
Ln(Sigma)	3.104***	3.434***	3.098***	3.484***	3.605***	3.466***
	(0.046)	(0.028)	(0.046)	(0.045)	(0.033)	(0.046)
n	7146	7146	7146	6462	6462	6462
Log Likelihood	-2543.21	-2936.75	-2533.60	-1082.413	-1163.2573	-1071.3571

* 90%, **95%, ***99% statistical significance using standard errors clustered on institution

TABLE 5: MAGNITUDES OF ELECTORAL AND REPRESENATION EFFECTS

All Universities

	Election	No Election
SAC Representation	94	96
No Representation	98	100

Universities without Ph.D. Programs

	Election	No Election
SAC Representation	51	69
No Representation	82	100