
By Vyacheslav Gorodetskiy
Advisor: Uri Wilensky
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I. Abstract

For many, Congress is an unapproachable group of people that we elect, but cannot truly influence without professional help. The recent Abramoff bribing scandal helped underline the power lobbyists have within government. Lobbyists carry enormous weight with politicians, by not only having incredible access to them, but also through the funds that they offer for the legislators’ re-election campaigns, contingent on votes. Because of these reasons, Congress has implemented various laws with the purpose of limiting lobbyists’ influence. In my research, I examine the rules set up by federal lobbying legislation over the years, from the Federal Regulation of Lobbying Act of 1946 through the most recent legislation - the Lobbying Accountability and Transparency Act of 2006. Instead of looking at the set of rules from a top-down approach, I choose to examine the lobbying process as a multi-agent problem, where the interacting agents are legislators, lobbyists and voters. By varying the different rules of the model, I attempt to see what truly affects lobbyists’ influence. Then, my goal is to find whether our legislators’ efforts are aimed at the relevant issues to determine legislation, or are misguided. In my work, I argue that legislators are generally on the right track, stressing wide access to information, further disclosure by groups and limits on directly contribution amounts. I also show that sticking to the original stance is not important for a politician’s candidacy.
II. Introduction

Many books and articles are written each year about how the American system of government has really changed from a republic to a government run by powerful, rich groups of people and businesses. Lobbying by “pressure groups” has been a troubling issue for the American population since the advent of big business in the late nineteenth century and the scare of other political systems in the twentieth. These groups employ professionals who work within the legislative process to influence on behalf of their clients. The lobbying professionals have educational trips and campaign contributions to influence Congressmen and Senators with, exchanging favors for legislators’ votes and control of legislation. They also have great indirect influence with the legislators, having sometimes worked with them as part of Congress.

While the first anti-lobbying efforts were targeted at pro-Nazi and pro-communist pressure groups in government, concerns over big business and rich, powerful individuals controlling government decisions have been seriously discussed since the 1930s. There is now legislation limiting contribution amounts and the number of years before a former Congressman or Senator can become a lobbyist.

A large issue with truly limiting lobbyists’ influence is that the activity is protected by the right to petition government of the Bill of Rights, so cannot be outlawed explicitly. While concerns of powerful organizations taking over government decisions are quite legitimate, any actions taken by government to control lobbying efforts must balance the restriction of lobbying activity with their right to do so. Since explicitly limiting their activity is difficult, Congress has lately been looking at the policy of disclosure to produce an effect on the system. Now, lobbyists are required to log their
expenditures, so that the public can find out the source of their representative’s campaign contributions, thus revealing whether they are more likely to be influenced by those specific groups.

All of the above lobbying rules were set up to curtail lobbyist influence for all political and electoral situations. It makes sense that less money contribution and greater transparency would lead to a change in the behavior of all candidates and the whole lobbyist community. This type of thought is an example of the top-down approach, where one would examine a rule by seeing how it would affect the populations as a whole. I choose to look at the rules and how they affect specific agents in all sorts of heterogeneous political and electoral situations through a model of heterogeneous voters and candidates. From those specific results, I then generalize to a conclusion about the whole. Thus, my multi-agent modeling approach is more of a bottom-up analysis, different from usual analysis of lobbying legislation.

In my research, I have chosen to focus on US Federal government regulations; however, there is much lobbying activity put forth at the state legislature level, as well as within foreign governments, with those legislatures churning out their own sets of lobbying restrictions and legislation, particularly legislation in countries of the European Union. The decision allows for more focus with the issue of such a large scope. I will explore rules set up by acts of Congress starting with the Act of 1946 and ending with the most recent proposal in Congress, from 2006.
III. Lobbying Background

Lobbying is a “process of petitioning government to influence public policy.” It is an important right of a citizen in a representative democracy to have access to your representatives and to be able to bring an issue to the attention of those who speak on your behalf in government. Lobbying groups are professional organizations whose sole purpose is to petition government on behalf of a “pressure group”, be it a teachers’ association, a disease-control organization or the National Rifle Association. Each one of these groups looks to get the ear of government to produce laws that would be favorable to their specific issues (“History of Lobbying”).

The process of lobbying has become such a seemingly complex and professional process that regular citizens do not feel like they have access to it. In fact, there is a whole street in Washington, DC – K Street – that contains thousands of lobbying organizations, whose sole purpose is to influence government decisions. Much of the money that is spent on lobbying goes to professional lobbyists’ salaries, special “educational trips” for legislators, and – the largest part – campaign contributions. Many legislators in power need to run for office again, and campaign finances are a major part of being able to defeat your opponent. Thus, complying with lobbyists’ requests may mean that the legislator will be able to stay in Washington.

The richer the lobby, the more influence it is likely to gain from a legislator; however, face time with legislators is also very important. Being able to charter a plane with a legislator to speak about issues is seen as a very effective tool of lobbying, and one that legislators are considering outlawing in the current lobbying restriction efforts.
To give a sense of how important the lobbying industry is, there are 30 lobbyists for every legislator in Washington. It is an enormous number, making lobbyists reach not only the legislators themselves, but various members of their staff and organization. 2.45 billion was spent on lobbying government in the past year (Wolpe 3).

Beside directly speaking to legislators and their employees, lobbyists reach out to the population for indirect influence. “Grass-roots campaigns” are an activity where lobbyists contact voters, directly or through mail, and encourage them to contact their Senator/Congressman about the specific issue that they are attempting to argue. That way, the request does not come from an interest group, but through the constituents of the legislators themselves. It is a major way for voters to petition their government without any intermediate groups, and is often spurred on by lobbying groups pushing the effort.

*Lobby Sectors*

Lobbying efforts may be split into three major sectors: the business lobby, the labor lobby, and the single-issue lobbies (Green 27-34).

<table>
<thead>
<tr>
<th></th>
<th>Client</th>
<th>Total</th>
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<tbody>
<tr>
<td>1</td>
<td>Finance, Insurance &amp; Real Estate Health</td>
<td>$2,116,701,718</td>
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<tr>
<td>2</td>
<td></td>
<td>$1,925,092,427</td>
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<tr>
<td>3</td>
<td>Misc Business</td>
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<td>4</td>
<td>Communications/Electronics</td>
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<td>5</td>
<td>Energy &amp; Natural Resources</td>
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<td>6</td>
<td>Transportation</td>
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<td>7</td>
<td>Ideological/Single-Issue</td>
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<td>8</td>
<td>Agribusiness</td>
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<tr>
<td>9</td>
<td>Defense</td>
<td>$493,204,322</td>
</tr>
<tr>
<td>10</td>
<td>Labor</td>
<td>$230,091,831</td>
</tr>
</tbody>
</table>

*Spending 1998-2005, from OpenSecrets.org*

The business lobby, also known as “big business,” has been very influential in government since the late nineteenth century. In the more near past, they have been
influential in defeating various labor law reform bills. Major players in the lobby are the U.S. Chamber of Commerce and Business Roundtable, which represent millions of companies with chairmen of large corporations on its boards. They even have their own lobby publication with thousands of subscribers. The lobby is generally pro-free trade, globalization, nuclear power, oil drilling and any general pro-business public policy, and anti-minimum wage, union and environmental regulation (Green 27-31).

The labor lobbying efforts are led by AFL-CIO’s lobbying arm. Since the 1970s, the lobby has been stymied a bit by lower labor union participation, allowing for major business advances. Their lobbying efforts tend to involve minimum wage for the worker, along with working conditions legislation and immigration curtailing (Green 31-32).

The smaller of the three, but perhaps the most noticeable lobby groups are the single-issue interest groups, such as pro-life and environmental groups. Largely very ideological and un-compromising, these groups tend to make a lot of fuss in Congress. They tend to “have long memories [and]… have been heralded as a new and dangerous political genre” (Green 32). These groups derive a lot of their power from their highly ideological supporters. The lobbies’ mailing lists have become a powerful way to get a message across, and legislators sometimes fear that these lobbies get out to their respective constituents more than they do. There have been numerous elections lost by legislators as a result of their vote on specific abortion legislation or international issue (Green 32-33). Another reason these groups are so powerful is that legislators tend to be particularly influenced by sensational issues; so, one small, very vocal group can carry more weight than two large, appeased groups.
Former Congressmen as Lobbyists

Some of the most influential, most well-respected and best-paid lobbyists are former members of Congress, as they have connections within government from their tenure, access to Congress facilities and knowledge of subtlety of law-making that others entering the field do not. Indeed, paying extra for services of a former member of Congress is well worth it for the lobbying groups (Green 34-37). And, this is widely acknowledged by all, more than ever, as a report by Public Citizen indicates. The report states that 43% of federal lawmakers who left since 1998 have registered as lobbyists. This is a major increase from leaving members from twenty years ago, which is a testament to the lobbying field’s expansion in recent years (“Congressional Revolving Doors” 4)

The process of former members of Congress, as well as other retired public officials becoming lobbyists is called “the revolving door.” The term refers to members of Congress going straight from the Congressional Hill to K Street, the center of lobbying activity. Law currently prohibits former public officials to register as lobbyists for a year after their term expired. However, many run lobbying firms, overseeing others for that year, then registering after the waiting period. (Green 34-37).
Recent Events

Recent events entailing influential lobbyist Jack Abramoff and lobbying fraud has brought lobbying regulation to attention of legislators. Abramoff pled guilty to three felony counts – conspiracy, fraud and tax evasion on January 3, 2006. He admitted to frauding the Native American tribes, as well as paying off legislators and officials. Reports implicate such respected figures of Congress as Bob Ney of Ohio, Tom Delay of Texas, John Doolittle of California and Conrad Burns of Montana. This has spurred another look at lobbying legislation, resulting in the Lobbying Accountability and Transparency Act of 2006.
IV. History of Lobbying Legislation

First efforts at legislation

In 1935, a group of lobbyists of public utility holding companies attempted to block legislation that would have broken them up. An investigation into their activities followed, leading to amendments in the Public Utilities Holding Company Act, which required registration of all agents of these companies to register. The Merchant Marine Act of 1936 followed with a similar sort of legislation, limited to the marine industry. In 1938, Congress passed the Foreign Agents Registration Act, which required lobbying agents of other governments to be registered, hoping to keep an eye on foreign entities’ meddling in US government. However, all of these acts were devised to fit certain industry-specific or political needs; none were sweeping pieces of lobbying legislation (“History of Lobbying”).

Federal Regulation of Lobbying Act of 1946 (FRLA)

In 1946, Congress finally passed a sweeping piece of legislation, covering all lobbying activity. It is an act that, though amended dozens of times through history, is at the cornerstone of Federal lobbying policy. Just like legislation before it, the FRLA did not attempt to limit lobbying, but rather provided for registration and disclosure of lobbying organizations, for public records. The law required

“financial reports with the name and address of the lobbyist and all paying clients; how much the lobbyist was paid; all contributors to the lobbying effort and the amount of the contributions; an itemized accounting of expenditures by the lobbyist; the identity of any publications that the lobbyist caused articles or editorials to be printed in; and the particular legislation the lobbyist was paid to influence. Violation of these reporting requirements could be punishable by a fine up to $5,000 or one year imprisonment and three-year prohibition on lobbying” (“History of Lobbying”).
The FRLA, however, had loopholes and omissions that were evident as the law was being passed. The law stresses the financial background of lobbying, but accounting provisions are not stressed nearly as much. The law is also ambiguous and seemingly contradictory on the description of persons covered under the law. The FRLA also puts a very large burden on lobbying groups to disclose all activity, whether they are related to lobbying efforts specifically or not, creating a problem of “over-disclosure” (“The Federal Lobbying Act of 1946). The act failed to cover grassroots campaigning, as well as disclosure of total amounts spent on each policy objective (only specific items disclosed). A major flaw was that there was no commission created to oversee the enforcement of the law. The registration of lobbyists and the disclosure to the Clerk of the House and the Secretary of the Senate seemed almost voluntary. Also, persons who spent less than half of their time lobbying were exempt from such reporting (“History of Lobbying”).

The legislation was so bad, in fact, that according to the US Government Accountability Office, 60% of lobbyists reported no financial activity, 90% reported no expenditures for salaries and 95% reported no public relations or advertising expenditures; only 32% reports a specific title of legislation lobbied (“History of Lobbying”). Those statistics are those who reported, which was, even at its peak at less than 50% (Zeller 100).

Furthermore, several court decisions in the 1950s, because of this ambiguity, defined lobbyists in the narrowest sense, as in “representations made directly to the Congress,” and not indirectly. Thus, media and pamphletng and other indirect lobbying efforts did not then fall under the FRLA. (Zeller 99).
Various Amendments to FRLA

The Byrd Amendment of 1989 set rules to prohibit federal employees to do “grassroots lobbying”, as well as prohibiting use of government funds to influence awards of a federal contract.

Because of a report commissioned in the mid-1990s on the subject of lobbyist influence, the Lobbying Disclosure Act (LDA) of 1995 passed in 1995 with bi-partisan support. The LDA clarified definitions of “lobbyist”, provided a threshold of when registration and reporting is required. Reporting requirements for lobbyists representing foreign interests were also modified.

The law left out issues such as accessibility to reported information, as reports were filed in paper format, not electronic, making information less accessible to citizens. There still was no agency created to enforce the law, as the Clerk of the House and the Secretary of the Senate are only responsible for collecting the reports, not enforcing the measure. The law also failed to address issues with the “revolving door” and “gifts and campaign contributions given by lobbyists to federal officeholders” (“History of Lobbying”).

Lobbying Accountability and Transparency Act of 2006

This law, introduced after the Abramoff scandal was created to have information about lobbying readily available to "the average citizen" by Internet (“Lobbying Accountability”):

- lobbyists have to disclose past government employment over past 7 years to spot conflicts of interests
- larger civic penalty for violations - $100,000
- lobbyists have to disclose recipients of gifts
- a one-year post-employment ban on lobbying activity
- registered lobbyists cannot travel with Members of Congress on corporate flights
- random audits of lobbying firms’ disclosure

There are, however, arguments that the bill did not do enough. In hearings for the bill, it was acknowledged that this is a much softer bill than was intended. Arguments for longer periods of how long former legislators have to wait to become lobbyists were given, along as controls on campaign finance of lobbying groups (“Lobbying Accountability”). Also, it is argued that there is a loophole about “educational trips” for legislators. Thus, for-profit lobbies can develop non-profit arms that can sponsor these all-expenses-paid educational trips that heavily sway legislators (Vaida 60).
V. Mode of Research

I choose the method of a multi-agent model for tackling the analysis of lobbying rules on the various parties involved in legislation. In this manner, I look at the whole political “world” as an interaction between three sorts of agents: voters, politicians, and lobbying groups. The empirical events happen as a result of all of these agents interacting, given certain rules and constraints. What I choose to do is to take these agents and model their behavior in a computer simulation, carried out in the NetLogo modeling language, created at the Center for Connected Learning and Computer-based Modeling at Northwestern University (Wilensky 1999).

Multi-agent modeling is composed of three basic ingredients: agents, an environment and rules of interaction (Epstein and Axtell 4). In my model, I only focus on agents and rules of interaction, while the environment and the agents’ location within it is not used. Agents possess private variables, such as politicians’ preferences. There are also rules of behavior, or interaction, of how each of the agents interacts with the other, such as a wolf eating a sheep if they are in the same vicinity (Wilensky 2006). So, through these various interaction between agents, we can garner statistics about what happens when certain variables in the world are at different levels. From there, we can generalize about what variables are important to the outcome.

This approach is particularly useful for looking at specific agents, and how they function as a group. It is a bottom-up approach, rather than a top-down approach that is often used when evaluating public policy and its effects on current behavior of agents. The multi-agent model approach also does not assume homogeneity of agents, as do many social science models of behavior, avoiding possible flawed results in the analysis.
Heterogeneity of voters, and their ideological distribution, is extremely important for this particular model, and the multi-agent approach is unique in allowing for that factor to appear in analysis.

Many times a model incorporates multiple variables, to find that one pivotal variable that is easy to control, but is also extremely important to the outcome of the model. Perhaps a single lobbying rule that is easy to implement would make more difference in legislators’ actions than a seemingly more important and prominent rule.

Multi-agent research was pioneered by Thomas Schelling in the late 1960s. His classic model was “Models of Segregation,” where he explored neighborhood interaction. In the model, each neighbor prefers to live next to specified number of people of the same “color”; if such a condition is not satisfied, the neighbor moves. The results of the study were quite stark, producing very ethnocentric communities, even if the neighbors are chosen to be relatively “color-blind.” So, even with weak assumptions on individual agents, one may have a model produce strong results with respect to the group as a whole (Epstein and Axtell 3). Forty years later, no longer constrained by computing power that made large simulations impractical, researchers are using agent-based tools to model everything from molecules’ interaction in a specified heated environment to school choice in public schools (Maroulis and Wilensky 2005). I attempt to follow in this tradition of modeling an environment and examining the effect of rules on the agents’ interaction.
VI. Model

**Defining the problem**

I set out to find how the different lobbying rules enforced by the Federal government relate to the optimal level of lobbying, and how that relates to the optimal outcome. Conceptually, I would like to find a most efficient solution to the problem of restricting lobbying. This solution is unlikely to be at the extremes of regulation. Zero lobbying is not efficient since, even if it were legal under the Constitution, we would want people to be able to lobby their government in even the most basic sense – it is their basic right in a representative democracy. It would also not be economically viable, as the enforcement costs of such a decision would be prohibitive. We would not want an unregulated lobbying system because of the various issues I described in the literature review: the government would become a government of special interests, rather than that of the people.

So, the most efficient solution lies somewhere between the two extremes. The question that Congress would like to tackle is finding this optimal point, and how to reach it. My research would like to know where this optimal point is relative to where we are now, and whether the steps we are currently taking and their magnitude are sufficient.

I define my primary objective, or my nirvana, as a government where the general population’s interests are best served; that is, their opinions are best taken into account when creating legislation. Surely, people who are part of that general population back the lobbying groups we are attempting to control. But, the question is whether some groups get an unfair amount of attention.
Issues that affect lobbying power:

- “Revolving door”
  - legislators who left office going to work for a lobbying group
  - former legislators have connections within government, as well as access to them in social settings
  - currently, there is a one-year grace period before a former legislator can be registered as a lobbyist – many supervise other lobbyists during that time
  - there have been proposals of extending the period to two years, as well as prohibiting former legislators from working at any lobbying firm for that time

- Direct lobbying
  - free chartered flights to locations for legislators
  - “educational trips” to promote the lobbyists’ issue
  - lobbyists’ one-on-one time with legislators

- Indirect lobbying
  - pamphleting about the issue to the voters
  - getting the media involved to cover the issue
  - grassroots campaigns

- How much lobbying activity is allowable before needing to register
- How much “open-ness” there is in the disclosures of lobbyists
• How available is information – paper/electronic?
  
  o Before the 1995 Act, all of the lobbyist financial disclosures were filed in paper form, making access to the information extremely difficult. It is now possible to access this information electronically.
  
  o There are proposals in Congress about making this information easily-accessible over the Internet, as well as easily-searchable and easily-sortable.

• Restrictions on campaign contributions
  
  o This is a major point that legislators are struggling over, as campaign contributions are a major way for lobbying groups to influence legislators.
  
  o It is a direct way for legislators to “get paid” for their votes on specific bills.
  
  o They need campaign contributions in order to stay competitive against their political opponents on Election Day.
Model Idea:
Model the behavior of politicians, given parameters involving lobbying groups, the political climate and the voters.

Underlying Concept:
The whole model revolves around budget priorities of the political candidates. We assume that a proportion of the budget can go to only 3 groups, and the percentages are not fixed. It is zero-sum game, meaning that the budget is fixed, and the only thing that changes is the vector of percentages that a person believes should go to each of the issues. Example: [0.35, 0.2, 0.45], meaning 35% of budget to issue 1, 20% to issue 2 and 45% to issue 3.

Each voter has an ideal idea of what he/she wants the vector to be. Each candidate has a malleable vector, that is an original and a current, which is influenced by a lobbying group, each associated with one of the 3 issues.

Agents: 2 candidates, 3 lobbying groups, n voters
Candidate attributes:
Objective: capture the most votes possible
- original vector of budget priorities (% of budget to each issue)
- current vector of budget priorities
- amount of money has gotten from groups

Lobbying group attributes:
Objective: achieve the highest % level of budget priority for its issue
- represents one of the 3 issues
- certain amount of influence endowment
- amount of money endowed to contribute to campaigns

Voter attributes:
Objective: choose a candidate that best fulfills their budget priorities, values
- a vector of budget priority values

Set-up:
Voters:
Get a budget priority vector – randomly selected

Candidates:
Get an original budget priority vector – randomly selected

Lobbying group:
Get a wealth endowment – randomly selected
Get an influence endowment – randomly selected
Other variables:

- “max-contribution-amt” – this is the maximum amount that a group can donate to a candidate’s campaign, no matter how much they have
  - concept:
    - there are contribution caps from individuals and groups, preventing specific wealthy groups from taking over a campaign
    - the left-over money can be used for direct lobbying of legislators
- “max-direct-lobby” – this is the maximum amount that a group can add to influence, by adding extra money to their influence endowment
  - concept:
    - there are limitations on direct lobbying to representatives, such as dinners and educational trips
    - this would come out of money that could not be used to directly contribute to the candidates’ campaigns
    - the other way to use left-over contribution money is to hire expensive ex-legislators that would help with influence – there are limitations on this as well
- “information-index” – this is the amount that people know about the lobbyists’ activity and their candidates’ taking of the lobbyists’ money
  - concept:
    - as time went on, there has been more and more emphasis on lobbyists registering with the government, improving voter knowledge of their activity
    - perhaps more importantly, the new legislation has delivered campaign contribution information to the Internet, making the information more accessible to voters
- “advertising-influence” – how much campaign money contributed changes the chances of the people voting for the candidate
  - concept:
    - With more money to campaign with, the candidate can do advertising on television, etc. for him/herself and against others
- “flip-flop-index” – how much the candidate’s movement from original position bothers the voters
  - concept:
    - As the candidates move from their original position on the issues throughout the campaign, people notice and call them “flip-floppers”
    - This was a major issue for the Kerry campaign in 2004
- “contribution-influence” – this is the amount that the candidate will change his/her budget priority when chooses an issue to take a contribution from
- “number-of-voters” – represents the number of voters created in the model
Each time-step:

Sketch:
1. Each group offers candidates a random percentage of their total wealth endowment to contribute to the candidates. In response, the candidate will change the priorities to favor the issue of the group that gave him the money.
2. Candidates evaluate which offer to take, evaluating how each offer would effect their standing with voters.
3. Candidates choose the best offer, and change their current budget vectors accordingly, by increasing the percentage of that issue and scaling down the percentages of others.
4. A count of voters is taken, updating the screen of who is in the lead.
5. Go back to step 1.

Specific:
1. each group chooses a random number percentage 0 - 100.
2. so, the allocation of money for that cycle for the group is the money endowment * that percentage.
3. if the cap on money for campaign is less than the allocation for the cycle, the leftover money goes to the influence variable, up to the maximum amount of direct lobbying.
4. the packages are presented to each candidate (different package from each group, to each candidate).
5. candidates evaluate how this would affect their standing within voters:
   a. how close the candidate’s current vector is to voter’s own (2/5 of total voter value)
   b. the amount of money have for campaign * advertising-influence (1/5)
   c. how much money candidate took, total * information-index (1/5)
   d. how much movement the candidate has done from original point * flip-flopper-index (1/5)
6. candidate chooses best package.
7. candidate adds percentage (which depends on contribution-influence and how much money) to the chosen issue, scales back all other issues.
8. voters are polled, and new numbers are updated for the candidates.
9. go back to step 1, till end of time-step 30.
Below is a screenshot of the model in the NetLogo software:

At each time-step:

Red candidate took the green group’s package, while the blue candidate took the white group’s package.
Specific Facts for the model:

Contribution limits:

The federal contribution limit for a multi-candidate committee (lobbying group) to a candidate or candidate committee is $5,000 per election cycle. This law was put in place in 1971, and amended in 1974, under the Federal Election Campaign Act. The law also required candidates to disclose sources of campaign contributions and expenditure (“Campaign Finance”). However, there are clearly non-profit organizations with more empowerment for contribution.

Effect of advertising:

In the Blagojevich/Topinka Illinois gubernatorial campaign of 2006, Rod Blagojevich raised $15,963,000 for his campaign, while Judy Baar Topinka raised $5,264,000. That is a 10.5 million dollar difference. Coming into the election, Judy Baar Topinka had a favorability rating score of 5.9 on a 0-10 point scale. At election-time, it was 4.8 on a 0-10 point scale. That is a drop of a full point, and I am assuming that this drop is equivalent to about 10% of the vote. This means that for every $1M raised, a percent of the vote is “bought” by the negative campaign advertisements of the leading advertising candidate (“Legislative and Judicial Contests”).

Effect of information index:

It is very difficult to quantify the ability of information to get to voters. However, we may be able to estimate that about 90% of lobbyists now report their activities to the Federal government. There is also legislation in place to post these files on the Internet, making it more readily available to the public. However, I do not have a good estimate of the index itself. Therefore, I will analyze its effect on the outcome without having a specific number in mind.
VII. Experiments

In the following experiments, I chose to run NetLogo’s tool called BehaviorSpace, which allows me to run the model for a specific number of times with different variables settings (Wilensky 1999). Then, I can extract results of certain reporters, such as the closeness of the winning candidate’s issue vector to that of the voter population.

Keeping all other variables equal, I vary a parameter at small increments, observing a result of the “go” sequence at each increment. Doing this produces results that may be plotted graphically. From those graphs, one can determine the influence of a variable, given a specific state of voters, candidates and lobby groups, as well as other variables (Epstein 2002).

I ran each of the following experiments for 30 time-steps, meaning that the “go” procedure was executed 30 times. At that time, the candidate with the larger number of votes was claimed the winner, and various statistics about the final situation were exported. Specifically, I exported the closeness of the final vector of the winning candidate to the average budget vector of the total population. Each experiment, at each specific value of the variable that was being changed, was repeated 50 times, so that the average was collected, and not just the individual run.

I also modeled three specific situations for each of the experiments, relating to all of the agents: lobbies, voters and candidates. I looked at the general case, where all of the voters’ and candidates’ vectors, as well as the lobby groups’ endowments, were chosen at random. I then looked at the case where there is a small (in popularity), but a powerful (in money endowment) group, and how the group’s standing within the winning
candidate’s vector compares with its proportional popularity in the electorate. Conversely, I also looked at the case where there is a large (in popularity), but relatively powerless (low money endowment) group. I believe these cases to be mostly affected by lobbying legislation – when there are small groups that have a lot of influence on government (where I’d want to curtail their influence, according to the goal of this thesis) and when there are large groups with little influence (where I’d want to increase their influence). In each experiment, the three cases were tested.

Additionally, I examined the case of a candidate with one issue that is originally very low on the agenda, and is unlikely to match the population’s popularity of the issue. In Experiment 7, I tested how the changes in “flip-flop-index” affect the electability of such a candidate.

I chose to look at varying all of the variables other than “max-direct-lobby” and the “number-of-voters.” The reason I felt that analyzing the effect of changing “max-direct-lobby” was unnecessary is that it is a weaker parameter than the “max-contribution-amt” (see Appendix A), and is not predicted to produce any results that would be different from analyzing the stronger parameter’s effect. Varying the “number-of-voters” variable was not necessary, as it is increasingly less important as the number of runs is increased. Since I did 50 repetitions of each of the experiments at each parameter value, larger “number-of-voters” values are not predicted to drive the outcomes.

The graphs presented in the following pages are based on the data attained through running BehaviorSpace, and presented in Appendix B.
Terminology:

When I say “closeness to voters,” I mean the difference between the relative preferences of the voters and the final vector of the winning candidate. When I say “Popularity-Final Fraction” or “Difference between popularity and final fraction,” I mean the difference between the relative number of voters who prefer that particular issue and the percentage of the budget that the issue got under the winning candidate.
Experiment 1:
Changing is flip-flop-index, from 0% to 100%
Advertising-influence: 40%
Information-index: 25%
Max-contribution-amt: $50
Contribution-influence: 10%

General case:

There does not seem to be much correlation in the graph above, leading us to believe that the “flip-flop-index” does not bother the candidates much when taking money – voters do not respond to it as much as the advertising.

Large/weak group case:

There does not seem to be much correlation between the “flip-flop-index” and how small/powerful groups do in the winning candidate’s vector.
Experiment 1:
*Small/powerful group case:*

Again, we see little difference in the final fraction of the issue, as the “flip-flop-index” increases.

Experiment 2:
Changing is flip-flop-index, from 0% to 100%
Adverting-influence: 80%
Information-index: 25%
Max-contribution-amt: $50
Contribution-influence: 10%

General case:

Again, especially with a stronger advertising index, flip-flop-index does not show any correlation with closeness to votes.
Experiment 2:

Large/weak group case:

There is little evidence for the “flip-flop-index” influencing the strength of large/weak groups.

Small/powerful group case:

There is little evidence for the “flip-flop-index” influencing the strength of small/powerful groups.
Experiment 3:
Changing is advertising-influence, from 0% to 100%
Flip-flop-index: 30%
Information-index: 25%
Max-contribution-amt: $50
Contribution-influence: 10%

*General case:*

There is a strong negative linear relationship between advertising and closeness to voters’ preferences of the winning candidate’s vector. That means that advertising strength strongly drives the candidates’ decision-making in interaction with lobbying groups.

*Large/weak group case:*

There is a slight negative correlation between advertising strength and the weakness of the final position of the large/weak groups. As advertising, and therefore money-taking, becomes better for candidates, the less-money-endowed groups lose more and more.
Experiment 3:  
*Small/powerful group case:*

![Graph](image)

Conversely, there is a slight positive correlation between advertising strength and the strength of the final position of the small/powerful groups. The more-money-endowed groups make their position stronger and stronger with more ad-influence.

Experiment 4:  
Changing is max-contribution-amt, from $10 to $100  
Advertising-influence: 80%  
Flip-flop-index: 30%  
Information-index: 25%  
Contribution-influence: 10%

General case:  
![Graph](image)

There is little evidence for correlation between maximum-contribution and closeness.
Experiment 4:

**Large/weak group case:**

There seems to be no strong pattern here, except for the blip in the 10-20 “max-contribution” range. That is the range where the weak groups can compete against the stronger groups, as the stronger groups’ money can’t be used as much.

**Small/powerful group case:**

We do not see the same blip in this graph as we do in the one above. But, we see a general positive linear trend for small/powerful groups’ strength as “max-contribution-amt” increases.
Experiment 5:
Changing is information-index, from 0% to 100%
Advertising-influence: 80%
Flip-flop-index: 30%
Max-contribution-amt: $50
Contribution-influence: 10%

**General case:**

There is a noisy, but strong positive trend between “information-index” and closeness to the voters’ preferences.

**Large/weak group case:**

There is little evidence of correlation between “information-index” and strength of large/weak groups.
Experiment 5:
Small/powerful group case:

Again, there is little evidence of correlation between “information-index” and strength of small/powerful groups.

Experiment 6:
Changing is contribution-influence, from 0% to 100%
Advertising-influence: 80%
Flip-flop-index: 30%
Information-index: 25%
Max-contribution-amt: $50

General case:

There is a strong negative correlation between “contribution-influence” and closeness to voters’ preferences. The increase in this variable makes changes in candidates’ preferences large at each time-step, and therefore makes the final vector noisier.
Experiment 6:

Large/weak group case:

There is little evidence of correlation between “contribution-influence” and strength of large/weak groups.

Small/powerful group case:

Again, there is little evidence of correlation between “contribution-influence” and strength of small/powerful groups.
Experiment 7: [one of the candidates has an issue he cares very little about, initially]
Changing is flip-flop-index, from 0% to 100%
Advertising-influence: 80%
Information-index: 25%
Max-contribution-amt: $50
Contribution-influence: 10%

**General case:**

There is little evidence of skewed candidates being affected by changes in the “flip-flop-index.” However, one must note that in the graph above, the candidate that is skewed never gets an average percent of votes above 50%. In fact, the mean percent of votes is 43%. This means that the skewed candidate is generally at a disadvantage against more balanced candidates.
VIII. Summary of Experiment Findings

There is a clear negative correlation between “advertising-influence” and the closeness of the final budget vector to the voters’ preferences. Experiment 3 also exhibits that the Small/powerful groups get stronger and the Large/weak groups get weaker with higher “advertising-influence” numbers.

We see the exact opposite effect in Experiment 5 with “information-index,” where the candidates get closer to voters’ preferences with more information about their dealings with lobbying groups. We do not see much correlation between “information-index” and Large/weak and Small/powerful groups’ final standing.

Results of Experiment 4 show little effect of maximum contribution on closeness of the winner’s preferences to those of the voters’. However, we see that the “max-contribution-amt” has an effect on the specific cases of Large/weak and Small/powerful groups. As expected, there is a positive correlation between the Small/powerful group strength and the “max-contribution-amt” variable, as the powerful groups can take advantage of the contribution amount more. With the Large/weak groups, we see that the group improves at the 10-20 “max-contribution-amt” range, as those are the values of endowment that those groups tend to have. Then, there is a clear negative correlation between the group’s final fraction in the winner’s vector and “max-contribution-amt.”

The most surprising result is the lack of influence that the “flip-flop-index” has on all aspects of the model. I chose to run a few experiments to see if this result would persist at different settings of “advertising-influence.” I expected that with less advertising influence, the “flip-flop-index” would have more effect on the model. In Experiment 2, where the “advertising-influence” is high (80), the “flip-flop-index” does
not show up at all. However, even with a weaker “advertising-influence” in Experiment 1 (40), there is still no visible correlation between “closeness” or “(popularity-final fraction)” with the index. Additionally, no effect shows in Experiment 7, where parameters are set up for a large “flip-flop” effect. We would expect that the skewed candidate would have to compensate a lot for having one issue so low, and would therefore suffer from a high index. However, it shows no correlation between “flip-flop-index” and the skewed candidate’s final percentage of votes. One hypothesis for this is that the “closeness to the voters” variable, which is taken into account more in the voter’s mind (see Appendix A), completely dominates the “flip-flop-index”, leaving no effect for it.

In Experiment 6, we see that the effect of increases in “contribution-influence” is a more noisy result, but that the final closeness of the winning candidate to the voters’ preferences worsens. With larger “contribution-influence,” each time a candidate takes a package, he changes his vector by a large amount. So, he cannot converge to an optimal location because of the large vector jumps at each time-step. So, we see that the closeness to the voters’ preferences worsening, but mostly because of the extra noise that “contribution-influence” adds to the model. It clearly has no effect on the outcomes of the different lobbying group situations.

In most of the graphs described above, I am observing correlation, rather than statistical correlation. The graphs are not exactly linear, which would be ideal. A reason is that many variables in the model are determined randomly. One of the strengths of the model is that it introduces heterogeneity in this way, producing imperfect data just as real-world data would. With more computer power, the data could be smoothed-out.
IX. Conclusions

I have found that the best predictor of candidates’ preferences’ closeness to those of the voters’ is increasing the spread of information about lobbying groups’ activities. This has been a major part of the legislators’ efforts since 2005, with information posted on the Internet, increasing access to this information.

This is even truer with less advertising influence, since high advertising influence numbers tend to shift candidates’ preferences away from those of the voters’. Thus, if legislators could decrease the advertising influence, the candidates would follow the voters’ preferences more closely. The most effective advertising that candidates do is “negative advertising,” not speaking for the specific candidate in political ads, but choosing to malign the opponent. If such advertising were outlawed, the advertising influence on voters would be severely curtailed, and the voters’ preferences would more strongly appear in those of the political candidates’.

Changing the maximum contribution amount produces a weaker effect on lobbyists’ influence. We do not see this amount affect the closeness of the candidates to the voters, but see that with high maximum contribution amount values, the more money-endowed lobbying groups take advantage over the less-endowed ones. The legislators have been addressing the maximum contribution amount in the past decade, making it a part of reform in the lobbying legislation in the past decade.

I was also expecting that the index that measures how much the candidate had changed his budget vector from the original stance would affect the outcomes strongly. However, it was found that changes in the “flip-flop” index do not affect candidate behavior. It appears that the index is overshadowed by the candidates’ concern for being
more in-line with the voters’ preferences. So, little effect of the “flip-flop” index means that the candidates are more likely to “evolve” their preferences to side with the relative preferences of the voters, rather than staying close to their original personal preferences.

Thus, the current efforts to bring more public information about groups and to curtail influence of large money groups are supported by my model’s results. Other possible ideas suggested by the model would be to disallow negative advertising, to curtail advertising influence. In these ways, legislators can ensure that elected officials best serve the general voting population’s interests.
X. Extensions

Model

A model is always an imperfect representation of the world – it is a simplification. We do not account for all nuances of the real world to get a result out of the model. Ideally, I would like to give all of my agents full realism. However, with a model, we sacrifice precision for a stronger conclusion, and perhaps interesting emergent properties. Thus, there are many extensions to this work, as my model is not all-inclusive (Elliott and Kiel 2002).

The model puts together many different issues into only a few factors that I am considering. An example is the people’s opinion of the candidate. I take into account how close the candidate is to their personal preferences, how much the candidate has changed policy, and how much money the candidate has for campaigning. I am not taking into account the effectiveness of campaigning money, the personal traits of the individual candidates and the effect of the media on the whole process. The effect of the campaigning money, in that way, may be understated, as most of what an average voter sees are campaign ads and media publications, not actual changes in position of the individual, etc.

Assumptions:

I assume a similar strategy for both candidates at all times, no matter what is happening in the “world.” However, it may be noted that candidates who are losing in the race for the position may be tempted to take larger gambles. That is, they would be tempted to take more money for more influence, in hopes to regain popularity through more advertising.
I give groups very limited ability and intelligence in lobbying government. They may be more likely to attempt to get influence over candidate B, if the candidate A already supports them greatly. They may also be forced to contribute to the candidate that they think will win, to gain influence in the future, whether they support him or not. I also did not talk about the power of a group endorsement, possibly responsible for swinging votes for the candidate. An example would be the Illinois Education Association endorsing a candidate, giving him/her the “good for schools” stamp. I ignore all effects of grassroots campaigning, though it is a hot topic in Washington. I simply assume it is incorporated in the closeness to the voter variable of the candidate.

I make a strong assumption of the variables in my model not being correlated. For example, the “flip-flop-index” is very strongly related to the “information-index,” as one needs information to learn about “flip-flopping.” Another example is one would get more money if your advertising is good. There are many such interactions that I choose to ignore.

A possible additional agent in the “world” that I am ignoring is the media. They make up a large part of popular opinion, and can make or break an election for the candidate. The agents would also be related to the “information-index” and the “flip-flop-index,” more the latter.

For convenience, I assume many of the variables work in a linear fashion. However, it is clear that variables like “flip-flop-index” are probably not linear. If the candidate makes a small movement, noone will notice. But a large movement would capture instant attention.
I make the assumption that in evaluating the different group packages, the candidate can accurately predict voters' reaction to his/her moves. I believe this assumption to be quite valid, as all serious candidates do extensive polling of voters, and have a good sense of their opinions. I work at one such company that does political polling of voters – Richard Day Research in Evanston.
XI. Appendix A: Model Specifications

Specific procedures from the model:

How votes are decided:

Here, we are trying to combine very separate concepts, such as advertising, public information and opinions into one index. I modeled the combining of these variables after how the Human Development Index is calculated in the UN calculations of countries’ development progress. The idea is to take each issue and adjust it as such: (issue – min-possible of issue) / (max-possible – min-possible). In all of my variables, the min-possible is 0 (“Human Development Indicators”).

closeness =
\[(\text{vote-i1} - \text{cand-i1})^2 + (\text{vote-i2} - \text{cand-i2})^2 + (\text{vote-i3} - \text{cand-i3})^2)/ 7500\]

Here, vote-i1 is the voter’s issue1 index, cand-i1 is the candidate’s voter index
Divide by the largest number the closeness is likely to be (7500) to get a fraction
Thus, the larger the number, the worse the evaluation of the candidate

advertising =
\[(1 - (\text{money1} / (\text{week#} * \text{max-contribution-amt})) * (\text{advertising-influence} / 100))\]

Here, we take the amount of money, find what percentage of the max amount it is and multiply it by the “advertising-influence” variable
[because the more money, the better, we take 1 – ad money]

information =
\[(\text{money1} / (\text{week#} * \text{max-contribution-amt})) * (\text{information-index} / 100)\]

Here, we take the amount of money, find what percentage of the max amount it is and multiply it by the “information-index” variable

movement =
\[(\text{vote-i1} - \text{cand-i1})^2 + (\text{vote-i2} - \text{cand-i2})^2 + (\text{vote-i3} - \text{cand-i3})^2)/ 140 * (\text{flip-flop-index} / 100)\]

Here, vote-i1 is the voter’s issue1 index, cand-i1 is the candidate’s voter index
Divide by the largest number the movement is likely to be (140) to get a fraction
Multiply by the “flip-flop-index” at the end

Total:
\[(\text{closeness1} * (2/5) + \text{advertising1} * (1/5) + \text{info1} * (1/5) + \text{movement1} * (1/5))\]

Then, the voter chooses which candidate’s total is larger and casts the vote, which is aggregated with others
Candidates’ choosing package:
Evaluation-index = (my-vote / 50) * (7 / 8) + (issue-influence / 100) * (1 / 8)
My-vote is the number of votes the candidate will get if he/she chooses this particular package, issue-influence is the influence number that the group comes in with.

Adjusting the vector after taking package:
[say, the issue chosen is issue1]
new-issue1 = new-issue1 + (100 - new-issue1) * (contribution-influence / 100) * (amount-of-money / max-contribution-amt)
The adjustment amount depends on how far from 0 the issue is at the time (the smaller the percentage now, the larger the increase), the “contribution-influence” variable and the amount of money given, relative to the maximum amount possible
new-issue2 = (new-issue2 / (new-issue2 + new-issue3) * (100 - new-issue1))
new-issue3 = (new-issue3 / (new-issue2 + new-issue3) * (100 - new-issue1))
This re-adjusts the old issues to the appropriate percentages
XII. Appendix B: Data Collected

Below are the mean numbers obtained after running each experiment in BehaviorSpace for 30 time-steps, 50 times at each setting of the model. In the General Case, “mean closeness” refers to the difference between the relative preferences of the voters and the final vector of the winning candidate (see closeness calculation in Appendix A for details). In the Large/weak Groups and the Small/powerful Groups cases, “mean difference” refers to the difference between the relative number of voters who prefer that particular issue and the percentage of the budget that the issue got under the winning candidate.

Experiment 1:

Changing is flip-flop-index, from 0% to 100%
Advertising-influence: 40%
Information-index: 25%
Max-contribution-amt: $50
Contribution-influence: 10%

<table>
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<tr>
<th>General Case</th>
<th>Large/weak Groups</th>
<th>Small/powerful Groups</th>
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* mean of 50 runs of each “flip-flop-index” setting, after 30 time-steps of the model
### Experiment 2:

Changing is flip-flop-index, from 0% to 100%
- Advertising-influence: 80%
- Information-index: 25%
- Max-contribution-amt: $50
- Contribution-influence: 10%

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* mean of 50 runs of each “flip-flop-index” setting, after 30 time-steps of the model

### Experiment 3:

Changing is advertising-influence, from 0% to 100%
- Flip-flop-index: 30%
- Information-index: 25%
- Max-contribution-amt: $50
- Contribution-influence: 10%

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* mean of 50 runs of each “advertising-influence” setting, after 30 time-steps of the model
Experiment 4:

Changing is max-contribution-amt, from $10 to $100
Advertising-influence: 80%
Flip-flop-index: 30%
Information-index: 25%
Contribution-influence: 10%

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* mean of 50 runs of each “max-contribution-amt” setting, after 30 time-steps of the model
Experiment 5:

Changing is information-index, from 0% to 100%
Advertising-influence: 80%
Flip-flop-index: 30%
Max-contribution-amt: $50
Contribution-influence: 10%

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* mean of 50 runs of each “information-index” setting, after 30 time-steps of the model
Experiment 6:

Changing is contribution-influence, from 0% to 100%
Advertising-influence: 80%
Flip-flop-index: 30%
Information-index: 25%
Max-contribution-amt: $50

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<th>General Case</th>
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<th>Small/powerful groups</th>
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* mean of 50 runs of each “contribution-influence” setting, after 30 time-steps of the model
Experiment 7: *one of the candidates has an issue he cares very little about,* initially

Changing is flip-flop-index, from 0% to 100%
Advertising-influence: 80%
Information-index: 25%
Max-contribution-amt: $50
Contribution-influence: 10%

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</table>

*mean of 50 runs of each “flip-flop-index” setting, after 30 time-steps of the model*
XIII. Acknowledgements

I started my thesis presentation stating, “You might be asking yourself, ‘Steve, you are an Econ major doing a Poli-Sci thesis with a Learning Sciences professor. What are you doing?’” My thesis is a project that I would not have expected I would do a year ago. The reason I had been able to complete such a work is the incredible breadth of academic and conceptual experience I have attained at NU, and I would like to acknowledge those responsible.

I would like to thank my thesis advisor, Uri Wilensky, for choosing to work with me, even though he is on sabbatical this year. I had gotten a great opportunity to work at his Center for Connected Learning and Computer-based Modeling, with Dor Abrahamson. I had learned an immense amount during my time at the Center, and that experience was the inspiration for the project.

It has also been cool to put together various ideas and concepts into the structure of my project. From my Law and Economics class with Professor Haddock, I learned about efficient externalities and how even though you’d want to stop extreme influence of small groups, it is extremely costly. So, the most efficient answer is not to get the least influence. In my Economics of Developing Countries class with Professor Kamal, I learned about the Human Development Index, and how different characteristics of countries are combined into one index. I later used this concept in multiple permutations in my model. At Richard Day Research, I got to experience lobbying groups and what they do, giving me the inspiration for the topic.

I would also like to acknowledge my parents, who had not let me fall behind on my thesis, as much as I’d wanted to. And, I would like thank my friends, who in the most important and difficult moments of work in the project, helped in their ways: from giving me motivation to work harder while running NetLogo on six computers at 4 am to fixing my computer when it broke the night before my thesis was due.
Works Cited


Wilensky, Uri and Reisman, Kenneth. “Thinking Like a Wolf, a Sheep or a Firefly: Learning Biology through Constructing and Testing Computational Theories”.


