

Campaign Spending and Lobbying

Greg Sasso

Bocconi University

gregory.sasso@unibocconi.it

Dan Alexander

Vanderbilt University

dan.alexander@vanderbilt.edu

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Abstract

We analyze a game-theoretic model of campaign spending and lobbying. Interest groups may spend money during the election to improve the electoral chances of candidates but may also spend money after the election to influence the policy that the winning candidate implements. Voters anticipate this lobbying and its effect on the final policy when choosing a candidate. When making campaign contributions today, interest groups must therefore anticipate how lobbying will affect the utility associated with electing each of the candidates from the perspectives of both voters and the interest groups themselves. We adopt extant technologies for each of the model's two stages in order to study the role that the polarization of interest groups and candidates has on expected campaign spending, lobbying expenditures, and final policy location in equilibrium. Further, we model several lobbying environments, each featuring different access to the politician. We find that policy moderation and campaign spending move in opposite directions, both within lobbying regime in response to exogenous changes but also when comparing across lobbying regimes. Our results also demonstrate that interest-group and candidate polarization must be considered jointly, as it is the relative values of these quantities that is most important for campaign spending and final policy location.

1 Introduction

The Koch brothers' PAC American for Prosperity pledged to spend 400 million dollars on the 2018 U.S. midterm elections.¹ The campaign was designed to help their preferred candidates (mostly Republicans) win the elections. At the same, both brothers sit on the board of the American Legislative Executive Council (ALEC). ALEC writes model legislation for legislators to introduce, essentially a subsidy for adopting the preferred policy positions of the Kochs.

Seeking to affect policy through multiple channels is not unique to this one family. Tripathi et al. (2002) and Lake (2015) show that the most influential interest groups routinely engage in both campaign spending and on lobbying. Further, much of the ire towards *Citizens United v. FEC* tacitly presumes, correctly, that interest groups are engaged in both campaign spending and lobbying.²

Indeed, there is no reason to assume these two instruments of influence are perfect substitutes for one another, or even substitutes at all. Campaign spending and lobbying affect policy in different but interrelated ways. Interest groups use campaign spending to help elect ideologically aligned politicians. After the election, though, the interest group may lobby whichever politician won, increasing the affinity of an aligned candidate or moderating the policy of the less aligned candidate.

This paper analyzes the joint usage of these two alternative means by which to influence policy outcomes. It does so with a two-stage model of two interest groups, two candidates, and one representative voter. In the first stage, interest groups may spend on the campaign for either or both of the two candidates. In the second stage, interest groups may then lobby the winning candidate to affect the politician's policy choice.

We interpret campaign spending as improving the electoral chances of a candidate. This

¹<https://thehill.com/homenews/campaign/371069-koch-network-to-spend-400-million-during-2018-midterm-election-cycle>

²<https://www.nytimes.com/2010/01/22/us/politics/22donate.html>. The article also discusses the role of interest group extremism as increasingly important given the enhanced role interest groups would certainly be taking.

may be through advertising, GOTV initiatives, or other investments, and we capture this by supposing interest group expenditures before the election increase a candidate's valence. We assume lobbying takes the form of help drafting bills, effort with administrative tasks, or assistance justifying a stance to voters. Each interest group as well as the winning candidate may exert effort at this stage. Through such efforts, lobbyists and politicians move policy closer to their own ideal points.

The campaign stage operates as an all-pay contest, à la Meirowitz (2008), among others. Interest groups pay money to increase their favored candidate's valence. The candidate with the with the best (from the voter's perspective) combination of ideal point and valence wins the election. Lobbying then takes the form of a "tug of war," as in Duggan and Gao (2018). The interest groups and winning politician exert effort to pull policy towards their respective ideal points; the final policy is a convex combination of these ideal points, weighted by each player's effort.

Spending in the first stage is driven by difference in interest-group utility under the two candidates. The more interest groups have to gain by electing an aligned politician, the higher is campaign spending. The question asked of the second stage is thus: when is the difference in final policies greater/smaller for the interest groups, and how much lobbying effort do the groups exert? Voters and interest groups anticipate the effect of lobbying on final policy and vote/spend accordingly.

We consider three different lobbying regimes. We first study campaign spending in the absence of any lobbying as a means of establishing a baseline for comparisons as well as to better understand the mechanics of the campaign stage. We next suppose that both interest groups have the same ability to influence the politician, regardless of their ideological alignment. We call this "open lobbying." Recognizing that politicians mete out access more selectively, we then allow only the aligned interest group to lobby the politician. We refer to this as "access lobbying."

Under open lobbying, opposing interest groups moderate one another. Despite an increase

of lobbying activity, policy moderation is at its highest, and as a result, campaign spending is (generally) at its lowest. The intuition is that when an interest group opposed to the politician is allowed to lobby, it helps moderate the final policy. This is a boon for the median voter. In addition, because policy is more moderate regardless of who wins the election, the two potential final policies (under the different candidates) are more similar than with fewer lobbyists. This makes winning the election less important to the interest groups and drives down campaign spending. We uncover an imperfect but strong inverse correlation between policy moderation and campaign spending across regimes, in fact, but recalling that campaign spending is assumed to positively impact voter utility through valence muddies the normative implications.

Under access lobbying, interest groups that are more extreme than politicians intensify differences in politician ideal points, but if interest groups are relatively less polarized than politicians, lobbying again exerts a moderating effect on the final policy. Indeed, while the polarization of politicians is important, it is not sufficient to determine equilibrium campaign spending or voter welfare. The ideological conflict between politicians and interest groups and between interest groups themselves also drives spending. The *relative polarization* between interest groups and politicians is more important than the level of polarization of politicians or interest groups when it comes to comparing the welfare implications of different lobbying environments.

The closest model to ours is Felli and Merlo (2007). In their paper, interest groups can both support campaigns and lobby elected politicians. In contrast to this paper, however, interest groups never do both in equilibrium. Our paper shows how both campaign spending and lobbying on behalf of the same politician can occur, exploring conditions under which they share or differ in their response to changes in exogenous factors. As stated above, the empirical literature consistently shows that interest groups spend money on both campaigns and lobbying for the same politicians (Tripathi et al. (2002), Lake (2015)), which is consistent with our model.

One way to conceptualize our model is with the inside/outside lobbying dynamic of Wolton (2017). Campaign spending (perhaps best thought of as advertising in this model) influences the public as *outside* lobbying. Our version of lobbying, on the other hand, directly influences the politician and would be an example of *inside* lobbying.

Other models that use the all-pay contest framework for campaigns include Meirowitz (2008) and Ashworth and De Mesquita (2009). However, these papers let politicians themselves make campaign investments. We depart by letting third parties, not politicians contribute to campaigns. Morton and Myerson (2012) do allow interest groups to contribute, but they do not analyze a lobbying stage later.

Our model differs from previous models that focused on informational campaign contributions and lobbying (Cotton, 2012; Dahm and Porteiro, 2008; Schnakenberg and Turner, 2017; Bennedsen and Feldmann, 2006). We specifically focus on ideological interest groups, and not information. Instead of only connecting lobbying to campaign spending through access, we allow both types of political spending to influence the final policy separately. This allows us to identify a separate, indirect linkage between campaign spending and lobbying and how it can affect voter welfare.

Other papers model both contributions and lobbying, but purely within a contributions-as-access framework (Cotton, 2009; Judd, 2017). Our approach allows us to compare a variety of lobbying regimes and not only focus on the direct contributions-as-access paradigm.

This paper also contribute to the small but growing literature on interest group ideology and its policy implications. Bonica (2013, 2014) develop of procedure to measure interest group ideology, while McKay (2010) shows that more extreme interest groups spend more on campaigns. That result is in line with this paper’s access lobbying regime.

Finally, the use of “off-the-shelf” models – and especially simple, straightforward forms of these models – for each stage allows us to focus on understanding the role of interest group polarization relative to candidate polarization in interest groups’ decision over campaign spending and lobbying. We believe this approach draws productively on prior research and

avoids contributing to the needless proliferation of new model technology. Moreover, for those interested in extensions or variations of the two-stage framework presented herein, the models in both stages are readily amenable to the incorporation of a variety of alternate assumptions and asymmetries.

The rest of the paper proceeds as follows. First we describe the model and solve the baseline case with no lobbying. Next we analyze the open-lobbying environment and its implications for the campaign equilibrium. We then turn to the access-lobbying equilibrium and compare the three lobbying regimes. We conclude by discussing policy implications and additional, related questions.

2 Model Preliminaries

Three distinct groups of players interact within the model: interest groups (G), politicians/candidates (P), and voters. For simplicity, we consider a single representative voter, often referred to as the median voter or simply the voter (M). All players have an ideal point on the real line. No platform commitment is possible by politicians.

The two candidates, one left-leaning candidate (P_L) and one right-leaning (P_R), have ideal points $\hat{x}_{P_R} = -\hat{x}_{P_L} = \pi > 0$. Similarly, there are two interest groups, one left-leaning (G_L) and one right-leaning (G_R), with ideal points $\hat{x}_{G_R} = -\hat{x}_{G_L} = \gamma > 0$. We set the voter's ideal point as $\hat{x}_M = 0$. The assumptions of symmetry in ideal points receive discussion below, alongside the interpretation of the parameters. As the relative polarization/extremism of interest groups and politicians is of central interest, the only assumption on the relative magnitude of π and γ is that the aligned politician and group are closer ideologically than the groups are to one another. We define the concept of relative polarization and state the assumption explicitly, which merely ensures that the interest groups would not ally together against the politicians to moderate policy beyond its final location in equilibrium.

Definition (Relative polarization). *If $\gamma > (<)\pi$, the interest groups are more (less) polarized*

than the politicians.

Assumption (Genuinely opposed interest groups.). $\gamma > \pi/3$

The model has two distinct stages: an election stage and a policymaking stage. In the first stage, the interest groups simultaneously make their campaign spending decisions, where s_{G_i, P_j} is the contribution of interest group G_i to P_j . The voter then chooses a candidate. After the election, the winning politician P_j and both interest groups simultaneously make their policymaking/lobbying effort decisions, $e_{P_j}, e_{G_i}, i = L, R$. Finally, policy is implemented and outcomes are realized.

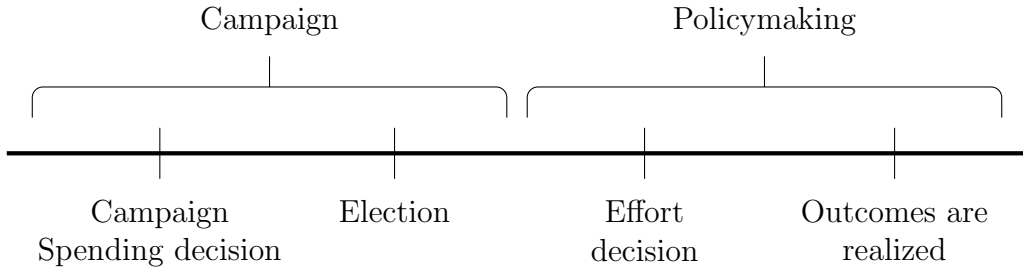


Figure 1: Game Timing

In addition to policy, the voter cares about politician valence. The total utility she receives if politician j wins the election with valence v_{P_j} and implements x_{P_j} is given by

$$U_M(x_{P_j}, v_{P_j}; \hat{x}_M) = -|x_{P_j} - \hat{x}_M| + v_{P_j} = -|x_{P_j}| + v_{P_j}.$$

Interest groups care about money spent on campaigns in addition to effort expended on lobbying and the policy that is ultimately implemented. Campaign spending converts into valence linearly with P_j 's valence being equal to:

$$v_{P_j} = \mu \cdot s_{P_j}, \tag{1}$$

where $\mu > 0$ and $s_{P_j} = \sum_{i=L,R} s_{G_i, P_j}$. The cost of lobbying enters quadratically into players

utility functions. Group i 's total utility from policy x_{P_j} being implemented is thus:

$$U_{G_i}(x_{P_j}, s_{G_i, P_L}, s_{G_i, P_R}, e_{G_i}; c, \hat{x}_{G_i}) = -|x_{P_j} - \hat{x}_{G_i}| - s_{G_i, P_L} - s_{G_i, P_R} - c \cdot e_{G_i}^2.$$

Politicians only care about policy and effort put forth in the policymaking stage, such that politician j 's utility from putting forth effort e_{P_j} and adopting final policy x_{P_j} is:

$$U_{P_j}(x_{P_j}, e_{P_j}; c, \hat{x}_{P_j}) = -|x_{P_j} - \hat{x}_{P_j}| - c \cdot e_{P_j}^2.$$

Lobbying takes the form of a tug of war game as presented in Duggan and Gao (2018) with three players. The winning politician and both interest groups make effort choices e_i . The final policy, denoted \tilde{x}_{P_j} , arises according to:

$$\tilde{x}_{P_j}(e_{G_L}, e_{G_R}, e_{P_j}; \hat{x}_{G_L}, \hat{x}_{G_R}, \hat{x}_{P_j}) = \frac{e_{P_j} \hat{x}_{P_j} + e_{G_L} \hat{x}_{G_L} + e_{G_R} \hat{x}_{G_R}}{e_{P_j} + e_{G_L} + e_{G_R}}. \quad (2)$$

A few comments are in order by way of interpretation. The multiplier on campaign spending, μ , measures the effectiveness of campaign spending; the higher μ is, the cheaper valence is to produce. The final policy is a convex combination of the winning candidate's and both interest groups' ideal points, weighted by the effort each put forward. Exerting more effort in the policymaking stage, then, pulls policy closer to one's ideal point (at a cost of $c \cdot a^2$). We first suppose both interest groups are given full access to lobby as much as they like. Later, we allow lobbying by only the winning interest group.

The opportunity cost of money spent during the campaign stage or effort exerted in the lobbying stage includes all manner of other activities in which interest groups engage; for example, they may fund raise, conduct membership drives, or increase salaries. The translation of efforts in the policymaking supposes diminishing returns to lobbying. We treat the politician as a strategic player in this stage, treating the winning candidate as a lobbyist, essentially. Of course, the politician could enact whichever policy she wants, but

we suppose that she must exert effort to marshal the resources necessary to counteract the interest groups and implement a policy closer to her ideal point than theirs. The tug-of-war technology is meant to capture just this. While we use the terms implement/enact, the politician need not be an executive. We may think of lobbyists vying to affect the policy position a legislator adopts.

The reader will likely notice the strong symmetry assumptions around the ideal points of the candidates as well as the those of the interest groups. Our primary interest is the relative extremism of interest groups and politicians, Our symmetry assumptions effectively assume each group (politicians, interest groups) are balanced ideologically. Incorporating asymmetry for the sake of completeness proliferates cases without much in the way of systematic insight gained. Such an endeavor would undoubtedly be more fruitful if motivated by a specific application. The only substantive mechanism within the model that is shutdown by the symmetry of ideal points is the voters' comparison of the two candidates. As discussed below, the final policies under the two candidates will always be symmetric, such that the anticipation of lobbying never leads the voter to prefer one candidate more than the other. This is not true for the interest groups, so campaign spending is by no means unchanged by the anticipation of lobbying in the second stage.

The appropriate equilibrium concept is subgame perfect Nash equilibrium (hereafter just equilibrium). While this suggests the analysis proceed via backwards induction, it is instructive to first examine the campaign stage in the absence of subsequent lobbying, as it provides a baseline from which to compare campaigns with lobbying afterwards. Further, this approach highlights the most important features to focus on when studying the second stage, viz., the difference in utility for interest groups under their preferred and less-preferred candidates.

3 The Campaign Stage

We model the campaign stage as an all-pay contest, with the two interest groups simultaneously making valence investments. The voter then picks the candidate she prefers given each candidate's valence, ideal point, and the knowledge of what policy the candidate will implement in the second stage. In this section, we consider campaign spending absent lobbying in the second stage.

Remark 3.1. *In the absence of lobbying in the second stage, the winning politician implements her ideal point in the policymaking stage, i.e., $\hat{x}_{P_R} = \pi$ if the voter elects P_R and $\hat{x}_{P_L} = -\pi$ if the voter elects P_L .*

Interest groups spend on campaigns during the election and must pay regardless of whether their candidate wins. In line with intuition, then, an early result establishes that interest groups only contribute to aligned campaigns. This result serves us throughout the paper, as the premise that the aligned candidate implements a policy closer to an interest group's ideal point continues to hold when we introduce lobbying.

Lemma 3.1. *If the policy implemented by an aligned candidate will always be closer to an interest group's ideal point than the policy implemented by the unaligned candidate, then interest groups only contribute to the campaigns of aligned candidates.*

A few definitions will be helpful for the further analysis. We say an interest group is the *winner (loser)* if their ideologically-aligned candidate wins (loses) the election. Let \bar{v}_{G_i} be the interest group's utility of winning the election and similarly let \underline{v}_{G_i} be the interest group's utility of losing the election. Denote the difference $\bar{v}_{G_i} - \underline{v}_{G_i}$ with Δ_{G_i} , which we will often refer to as the value of winning for an interest group.

Lemma 3.2. *Let $\gamma \geq \pi$. Then $\Delta^{G_i} = 2\pi$. Similarly, let $\gamma < \pi$. Then $\Delta^{G_i} = 2\gamma$.*

Without lobbying, the value of winning the election is the utility difference between the two candidates' ideal points. Because the politicians' and interest groups' ideal points are

symmetric around 0, the two groups share the same value of winning. Indeed, this will be true in subsequent sections. As such, we will suppress the subscript for the winning value; in this section, with no lobbying, we instead write Δ^N . When the interest groups are more extreme than the politicians, this utility difference is simply the difference between the politicians' ideal points (2π). If the politicians are more extreme, however, the utility difference is the difference between the groups' ideal points instead (2γ).

The symmetry of implemented policies around 0 also has implications for the voter's decision, as the next result makes clear.

Lemma 3.3. *If the policies implemented by the two candidates are symmetric around the voter's ideal point, the candidate with the highest valence wins the election.*

No pure-strategy equilibria exist in this game. If, for example, the left interest group was going to spend Δ^N for sure, then the right interest group's best response is to just spend nothing; also spending Δ^N only results in winning the election half of the time. This only gives an expected benefit of $\frac{\Delta^N}{2}$, and therefore an expected net benefit of $-\frac{\Delta^N}{2}$. However, if the right interest group was always going to spend 0, then the left interest group should clearly spend less than Δ^N and still win. Instead, equilibrium spending has support from 0 up to the full benefit of winning the election.

The interest groups then use a mixed strategy for their valence bids, formalized in the following proposition.

Proposition 3.1. *With no lobbying in the second stage, the equilibrium spending of both interest groups is distributed uniformly over the interval $[0, \Delta^N]$.*

Note that the multiplier μ , which specified the rate at which money converted to valence, has dropped out of the above equations. This is a result of the symmetry assumptions

Corollary 3.1.1. *With no lobbying in the second stage, expected total spending in equilibrium is Δ^N .*

Proposition 3.2. *With no lobbying in the second stage, expected spending is increasing in politician polarization (π) when interest groups are more polarized than politicians. When interest groups are relatively less polarized than politicians, increasing politician polarization has no effect on expected spending.*

With no lobbying in the second stage, expected spending is increasing in interest group polarization (γ) when interest groups are less polarized than politicians. When interest groups are relatively more extreme than politicians, increasing group polarization has no effect on expected spending.

The starkness of this result stems from our stylized assumptions, principally the absolute-loss policy component of utility functions, but it nicely highlights the central logic animating campaign spending without lobbying. When interest groups are more extreme than politicians, the gain in proximity of the final policy to their own ideal points from electing their aligned candidate does not change as their own ideal points become more extreme.³ It is fixed as the distance between the politicians' ideal points. Therefore if groups are more extreme than the politicians, increased interest group polarization does not increase expected campaign spending, but increased politician polarization does.

When politicians are relatively more extreme, increasing politician polarization has two effects. It makes the aligned politician less appealing to the allied interest group; however, it also makes the misaligned politician less appealing to the same interest group. These two effects cancel out,⁴ leaving expected spending at the same level. Increasing interest group polarization increases the alignment of interest groups and politicians. In turn, this increases the value of winning, thereby increasing campaign spending.

We turn to the lobbying stage next, bearing in mind that the most relevant consideration is how lobbying affects the value of winning for an interest group.

³The utility of this gain would change if players were not risk neutral, but any such change is clearly not robust to the functional form of policy loss.

⁴See the previous footnote.

4 The Lobbying Stage

In the lobbying stage, both interest groups and the winning politician can expend effort to minimize the distance from the final policy as given by Equation 2 to their ideal points, taking into account the cost of effort, $c \cdot e^2$. Recall, we see such effort as representing more than just spending money. Instead, it also encompasses writing legislation, assigning staff, having meetings, selling stances to constituents, and other effort-intensive legislative activities.

Duggan and Gao (2018) develop and thoroughly explore this model of lobbying. Their results allow us to quickly establish several statements about the policy under each candidate, effort choices, and the value of winning for interest groups in equilibrium. We first explore open lobbying, in which both interest groups lobby the winning candidate, regardless of her ideological alignment. We then consider access lobbying, in which only the ideologically aligned interest group lobbies the politician. The following results address open lobbying, for which we superscript key quantities with O .

Lemma 4.1. *Under open lobbying, the equilibrium policy if the voter elects the right-leaning candidate is*

$$\tilde{x}_{P_R}^O = \pi + 2\gamma - 2\sqrt{\gamma(\gamma + \pi)} \in (0, \min\{\gamma, \pi\}), \quad (3)$$

and if the left-leaning candidate wins the election, the equilibrium policy is given by

$$\tilde{x}_{P_L}^O = 2\sqrt{\gamma(\gamma + \pi)} - 2\gamma - \pi \in (\max\{-\gamma, -\pi\}, 0). \quad (4)$$

It is worth noting that the equilibrium policies lie in between the politicians' ideal points as well as in between the interest groups' ideal points. Because of the assumption that each interest group is closer ideologically to its aligned politician than the other interest group, the tug of war over the final policy results in moderation in policy vis-à-vis politician or interest group ideal points. Figure 4 shows the anticipated final policies under the two different candidates are now closer together and closer to the voter's ideal point. One effect is that

the policy benefit of winning the election is now smaller to the interest groups, though still positive. The losing group exerts more effort on policy than the winning group in equilibrium, however, ensuring that the value of winning the election is still positive.

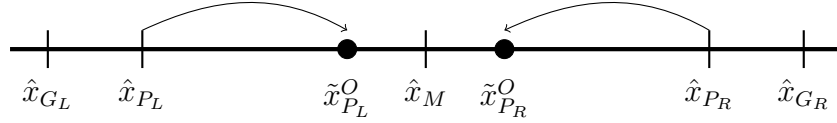


Figure 2: Location of policy after open lobbying

Opposing interest groups have the effect of moderating the final policy. The more polarized the interest groups, the more moderate the lobbied policy will be, and the more similar the effort each group will need to exert in equilibrium regardless of the winning politician. As such, the value of winning the election falls in the extremism of interest groups, leading campaign spending in the first stage to fall.

As politicians grow more extreme, the lobbied policies anticipated under the two candidates pull away from each other. Additionally, interest groups will exert less effort in equilibrium if their aligned candidate wins. These two effects of increased politician polarization increase the value of winning for interest groups and thus lead to increased campaign spending in the first stage summarize these insights in the following proposition.

Proposition 4.1. *The value of winning the election for each interest group under open lobbying*

$$\Delta^O = (\sqrt{\pi + \gamma} - \sqrt{\gamma})^2 \left[2 + \frac{\sqrt{\gamma}}{\sqrt{\pi + \gamma}} \right]. \quad (5)$$

Both groups' spending in the first stage is distributed uniformly over $[0, \Delta^O] > 0$.

Expected campaign spending is thus Δ^O .

Corollary 4.1.1. *Expected campaign spending under open lobbying is increasing in π and decreasing in γ .*

5 Access

“We had a hierarchy in my office in Congress. If you’re a lobbyist who never gave us money, I didn’t talk to you. If you’re a lobbyist who gave us money, I might talk to you.” – Mick Mulvaney⁵

We interpret this quotation to suggest that only interest groups that donated to the winning candidate in the first stage may lobby politicians in the future. McKay (2018) presents more systematic evidence that campaign contributions buy access, showing that politicians do not just implement policies favored by supported interest groups but also use language specifically written by groups that hosted fundraisers. While this might suggest that interest groups ought to donate to unaligned politicians, such politicians would still likely prioritize aligned groups such that in equilibrium, groups would still only contribute to a single campaign.⁶ This may be reflected in Mulvaney’s sentiment that contributions were a necessary but not sufficient condition for access.

In accordance with this view of lobbying, in this section we allow only the aligned interest group to lobby the politician in the second stage. We superscript key terms with A to represent the access-lobbying assumption underlying them. The lobbying problem is similar, though the lobbied policy in equilibrium is a convex combination of the winning politician and her aligned interest group’s ideal points, weighted by their efforts. Specifically, in equilibrium the final policy splits the difference of these ideal points.

Lemma 5.1. *If the right-leaning candidate wins the election, the final, equilibrium policy is*

$$\tilde{x}_{P_R}^A = (\gamma + \pi)/2.$$

If instead the left-leaning candidate wins the election, the policy enacted in equilibrium is

$$\tilde{x}_{P_L}^A = -(\gamma + \pi)/2.$$

⁵<https://www.vox.com/policy-and-politics/2018/4/25/17279244/mick-mulvaney-cfpb-lobbyist-donations-banks>

⁶This would be a profitable but rather complicated assertion to formalize, a direction for future research that we discuss in the conclusion.

Figure 3 shows that extreme interest groups can now pull the final policy away from median voter, as there is no counterweight from the losing interest group.

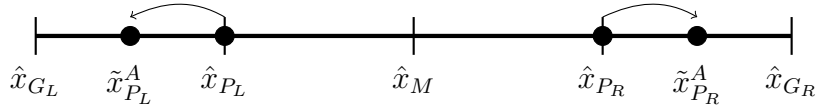


Figure 3: Lobbying Difference for Extreme Interest Groups

Moderate interest groups may also moderate an aligned but relatively extreme politician, vis-à-vis the policy the politician would implement without any lobbying. While, the final policy is not as moderate as the open-lobbying final policy, the aligned interest group may prefer the access-lobbying final policy if politicians are not too polarized relative to interest groups; in such cases, the access-lobbying policy will be closer to the aligned interest group's ideal point than under open lobbying.⁷

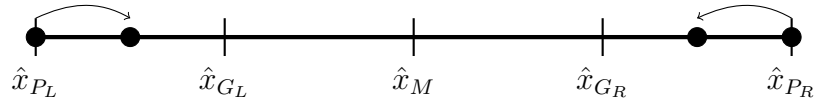


Figure 4: Lobbying Difference for Moderate Interest Groups

Proposition 5.1. *Under access lobbying, interest group equilibrium spending levels are distributed uniformly with support $[0, \Delta^A]$ such that expected total campaign spending is Δ^A , where*

$$\Delta^A = \begin{cases} \pi + \gamma - \frac{\gamma - \pi}{4} & \text{if } \pi < \gamma, \text{ i.e., if interest groups are relatively more polarized} \\ 2\gamma - \frac{\pi - \gamma}{4} & \text{if } \pi \geq \gamma, \text{ i.e., if the candidates are relatively more polarized.} \end{cases}$$

Note that the expression for Δ^A depends on whether the interest groups are relatively moderate or extreme. When the interest groups are more polarized than politicians, the absolute polarization between the politicians plays as large a role in the value of winning the election as absolute polarization of the interest groups. However, if the politicians are relatively extreme instead, the interest group polarization accounts for the lion's share of

⁷We revisit this comparison in the following section.

the value of winning. The mechanism underlying this difference is as follows: when interest groups are less polarized than politicians, the anticipated final policies straddle each interest group’s ideal point, leaving the distance between the interest groups as the primary determinant of the value of winning the election. The next result makes precise the way that equilibrium campaign spending depends on the polarization of interest groups and politicians.

Corollary 5.1.1. *Expected campaign spending under access lobbying increases in the polarization of interest groups, with the rate of increase slowing when interest groups are relatively more polarized than politicians.*

Expected campaign spending under access lobbying increases in the polarization of the candidates as long as politicians are less polarized than interest groups. When interest groups are relatively less polarized, spending falls in politician polarization

6 Comparisons

In this section we compare the three lobbying regimes considered above – open lobbying, access lobbying, and no lobbying – along two outcomes: campaign spending in the first stage and the moderation of policies implemented in the second stage. The first result states that open lobbying entails less campaign spending in equilibrium than no lobbying or access lobbying as long as politician polarization is less than or not too much larger than interest group polarization. The second result says that open lobbying always produces more moderate policies than the other two regimes; access lobbying produces more moderate policies than no lobbying if and only if politicians are more polarized than interest groups.

Taken together, the results indicate that expected campaign spending across regimes is not a perfect proxy for policy extremity. Furthermore, campaign spending translates into valence in the model. As such, voters benefit from more campaign spending as well as more moderate policies. We close this section by considering voter welfare in a comparison of

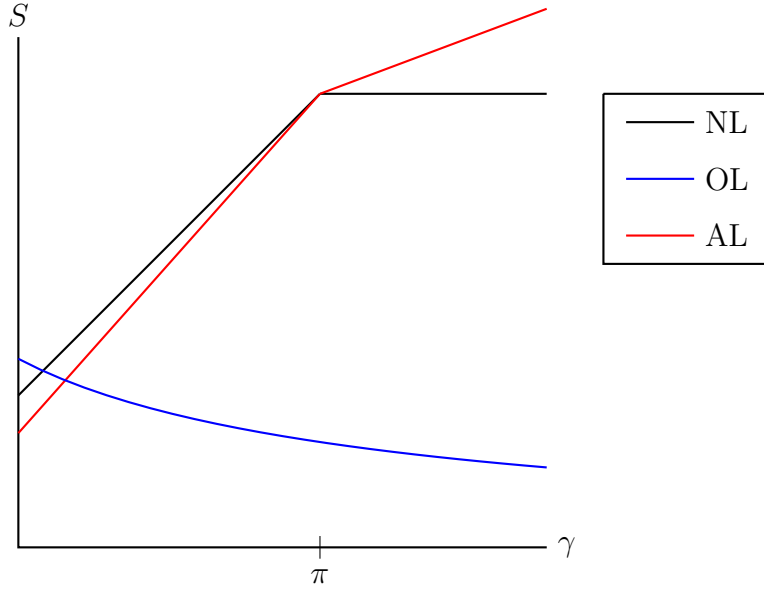


Figure 5: Expected Campaign Spending by Group Polarization

access and no lobbying.

Proposition 6.1. *There exists a value of politician polarization $\bar{\pi}(\gamma) > \gamma$ such that if politicians are not more polarized this level, i.e., $\pi < \bar{\pi}(\gamma)$, campaign spending is lowest under open lobbying.*

Figures 5 and 6 demonstrate that when interest groups are much less polarized than politicians, open lobbying results in the most spending. However, it also results in the best policy for voters. When groups are very extreme, on the other hand, access lobbying results in the most spending and open lobbying results in the least. Yet open lobbying is still best for voters on a policy basis. This highlights how campaign spending is not a sufficient proxy for policy extremity.

Proposition 6.2. *The voter always prefers policies under open lobbying to those under no lobbying and access lobbying. No lobbying produces more moderate policies than access lobbying when interest groups are extreme relative to politicians. When politicians are more polarized than interest groups, however, access lobbying produces policies closer to the voter's ideal point than no lobbying.*

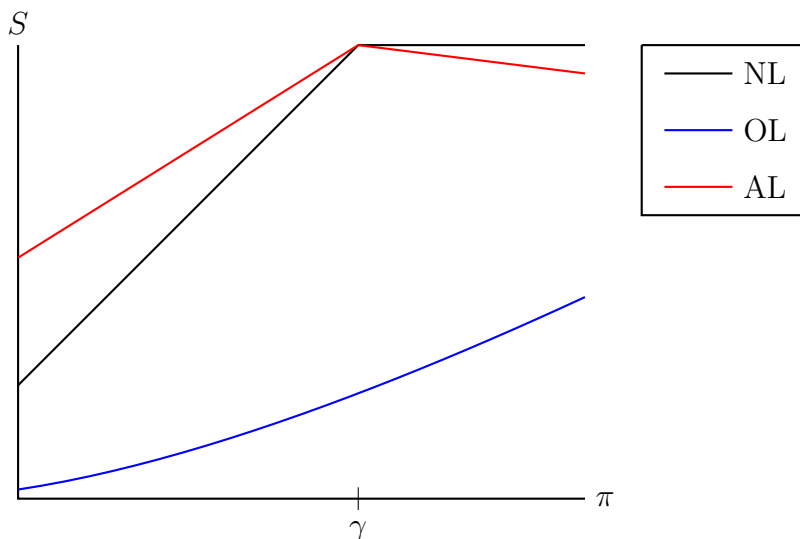


Figure 6: Expected Campaign Spending by Politician Polarization

Comparing Figures 7 and 8, we see open lobbying always results in a better policy for the voter than both access lobbying and no lobbying. The second best lobbying regime, however, is conditional on the relative polarization of interest groups and politicians. When interest groups are relatively extreme, access lobbying policy is unambiguously worse for the voter than no lobbying.

It is quite likely that the most policy-relevant question pertains to the comparison of access lobbying (likely the reality of US politics today) and no lobbying (limits on lobbying being a more plausible counterfactual than open lobbying). When interest groups are less polarized than politicians, no lobbying produces higher campaign spending and less moderate policies, with the opposite being true when interest groups are more extreme than politicians. Given that voters benefit from campaign spending via the valence it produces, the lobbying regime that produces the most utility for the voter is not only dependent on relative polarization but also on the translation of spending into valence (see Equation 1). As a result, no clear winner emerges between access lobbying and no lobbying with regard to voter utility.

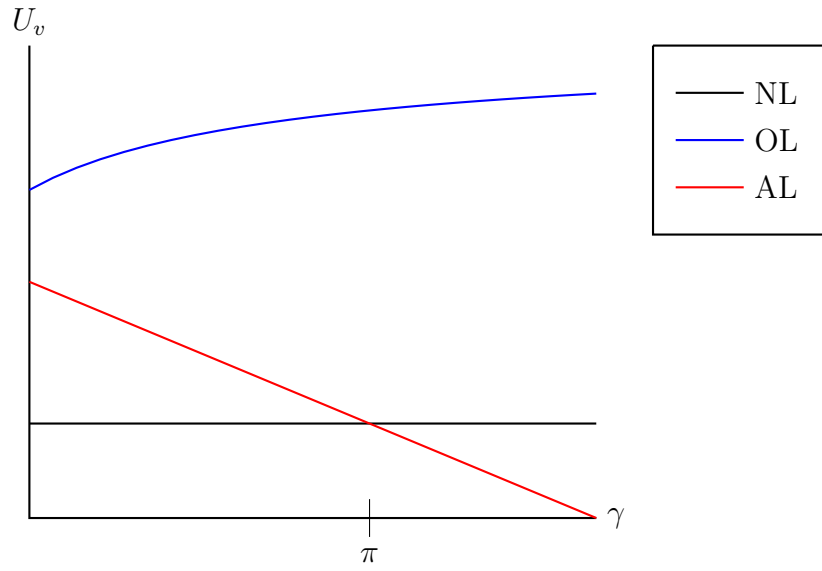


Figure 7: Voter Policy Utility by Group Polarization

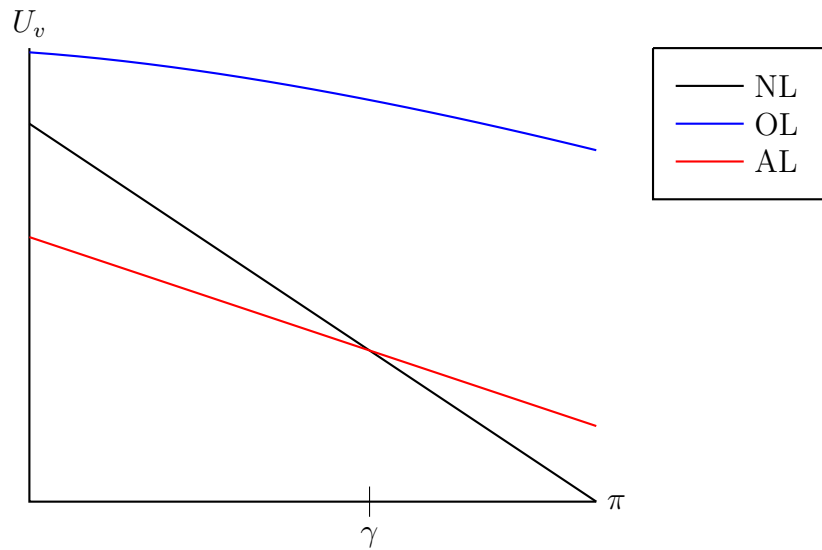


Figure 8: Voter Policy Utility by Politician Polarization

7 Conclusion

This paper demonstrates first and foremost that different means of political influence are not independent decisions, and they ought to be studied in tandem. Our results highlight how lobbying in the future affects the campaign contributions today. Specifically, interest group campaign contributions increase as the benefit of having an ideologically aligned politician in office rather than her opposition increases. Furthermore, polarization between candidates is not enough to explain campaign spending or equilibrium policy location. The interaction of candidate polarization and interest group polarization drives both campaign spending and lobbying effort.

We consider the inter-dependency of campaign spending and lobbying under three different stylized lobbying regimes: 1) no lobbying, 2) open lobbying (in which aligned and unaligned interest groups have equal ability to influence the winning politician after the election), and 3) access lobbying (in which only the aligned group may influence the politician's policy choice). One insight from this comparative analysis is that U.S. politics today may, in fact, suffer from too little lobbying. Moving from access lobbying to open lobbying improves policy for the median voter and lowers campaign spending. In this sense, one might wish to enable a wider spectrum of influence on politicians.

If facilitating a greater diversity of viewpoints to influence politicians is not feasible, then the optimal lobbying regime is ambiguous, especially when we treat campaign spending as a boon for voters. If we are worried more about extreme interest groups, then limits on lobbying may have moderating influence on policy. However, if politicians are relatively extreme instead, these lobbying limits will actually cause more extreme policies. Each of these suggestions is tempered by the finding that increased moderation of policy in these two regimes correlates to decreases in valence produced for the voter.

A number of potentially fruitful avenues for related work presented themselves throughout our analysis. Because we built productively upon extant models, each of which feature several extensions/variations already worked out, extensions/variations motivated by cases

not covered by our model are likely achievable. What of interest groups that are much more moderate than politicians (more moderate than our assumptions allowed)? How do they allocate resources to campaigns expenditures and lobbying efforts?

Future work may wish to extend the model to speak to different limitations on spending. Three such limitations come to mind. The first is a finite budget, such that interest groups face a potential tradeoff between spending limited resources in the pre-election and post-election stages. The second is a limit on campaign contributions, most interestingly compared to the third, an analogous regime that instead limits lobbying expenditures.

We do not allow politicians to make campaign investments in themselves, instead focusing on interest group decision making. Certainly this comes at a loss of some verisimilitude. How does interest group spending and lobbying change when politicians adopt a strategic role in the first stage?

A final suggestion is to consider multiple political offices. Large interest groups give to multiple races at once. How does future lobbying of coalitions of politicians affect the distribution of spending across many simultaneous campaigns?

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A Proofs

Proof of Lemma 3.1. Contributing to the unaligned candidate would reduce the effect of contributions to the aligned candidate while reducing utility in the second stage. ■

Proof of Lemma 3.3. This follows immediately from the voter's utility function. She incurs the same loss of utility from policies symmetric around her ideal point, $\hat{x}_M = 0$. Her best choice of candidate, then, is the one with the highest valence. ■

Proof of Lemma 3.2. If the interest groups are more polarized than the politicians, $\Delta^N = -(\gamma - \pi) - [-(\gamma - -\pi)] = \pi - \gamma + \gamma + \pi = 2\pi$.

If interest groups are relatively less polarized than politicians, then $\Delta^N = -(\pi - \gamma) - [-(\gamma - -\pi)] = \gamma - \pi + \gamma + \pi = 2\gamma$. ■

Proof of Proposition 3.1. Consider an affine transformation of interest group utility in which each is divided by Δ^N after having adding a constant such that interest group G_i (aligned with politician P_i) receives $\Delta^N - s_{G_i, P_i}$ if it wins the election and $-s_{G_i, P_i}$ if it loses. Substituting in $s_{G_i, P_i} = v_{P_i}/\mu$, we have utility functions that are equivalent to those in Equation (2) of Meirowitz (2008). Proposition 2 from Meirowitz (2008) may then be applied, with $\frac{1}{\beta} = \mu\Delta^N$. To back out spending, however, we must divide equilibrium valence produced by $1/\mu$, such that spending is distributed uniformly over the interval $[0, \Delta^N]$. ■

Proof of Corollary 3.1.1. It follows from the uniformly distributed spending that the expected campaign expenditures for each interest group are $\Delta^N/2$. With two candidates spending independently, total expected expenditures are Δ^N . ■

Proof of Proposition 3.2. If the interest groups are more polarized than the politicians, $\Delta^N = -(\gamma - \pi) - [-(\gamma - -\pi)] = \pi - \gamma + \gamma + \pi = 2\pi$.

If interest groups are relatively less polarized than politicians, then $\Delta^N = -(\pi - \gamma) - [-(\gamma - -\pi)] = \gamma - \pi + \gamma + \pi = 2\gamma$.

The first derivative with respect to π is positive when interest groups are more polarized than politicians and 0 when groups are less polarized than politicians.

The first derivative with respect to γ is positive when politicians are more polarized than politicians and 0 when politicians are less polarized than groups. ■

Proof of Lemma 4.1. The policies follow immediately from Duggan and Gao (2018, p. 9). ■

Proof of Proposition 4.1. The only aspect of the results that do not follow immediately from Lemmas 3.1 and 3.3 or adaptations of Proposition 3.1 and Corollary 3.1.1 are the value of and comparative statics on Δ^O . We set $A := (x_{G_R} - x_{G_L}) = 2\gamma$, $B := (x_{P_R} - x_{G_L}) = \pi + \gamma = (x_{G_R} - x_{P_L}) =: C$, and $D := (x_{P_R} - x_{P_L}) = 2\pi$, working in terms of A, B, C so as not to wash over effects with symmetry before necessary.

We first verify the open-lobbied policies are symmetric, i.e., the difference in voter utility from each of the potential, anticipated policies is zero:

$$\begin{aligned}
& - (x^*(P_R) + x^*(P_L)) = \\
& - (x_{P_R} + x_{P_L}) + \sqrt{2A}(\sqrt{B} - \sqrt{C}) = \\
& - (\pi - \pi) + \sqrt{2A}(\sqrt{B} - \sqrt{B}) = 0.
\end{aligned}$$

We then calculate the distance between the anticipated, open-lobbied policies, noting

that both will lie on the same side of a given interest group's ideal points.⁸

$$\begin{aligned}
x^*(P_R) - x^*(P_L) &= x_{P_R} + x_{G_R} - x_{G_L} - \sqrt{2}\sqrt{(x_{G_R} - x_{G_L})(x_{P_R} - x_{G_L})} \\
&\quad - (\sqrt{2}\sqrt{(x_{G_R} - x_{G_L})(x_{G_R} - x_{P_L})} - x_{G_R} + x_{G_L} + x_{P_L}) \\
&= (x_{G_R} - x_{G_L}) + (x_{P_R} - x_{G_L}) + (x_{G_R} - x_{P_L}) \\
&\quad - \left(\sqrt{2(x_{G_R} - x_{G_L})(x_{P_R} - x_{G_L})} + \sqrt{2(x_{G_R} - x_{G_L})(x_{G_R} - x_{P_L})} \right) \\
&= A + B + C - \sqrt{2AB} - \sqrt{2AC} \\
&= A + 2B - 2\sqrt{2AB} \\
&= (\sqrt{A} - \sqrt{2B})^2 \\
&= (\sqrt{2\gamma} - \sqrt{2(\pi + \gamma)})^2 \\
&= (\sqrt{2}(\sqrt{\pi + \gamma} - \sqrt{\gamma}))^2 \\
&= 2(\sqrt{\pi + \gamma} - \sqrt{\gamma})^2
\end{aligned}$$

The difference in costs for a group from electing an aligned candidate rather than the un-

⁸We need only do this calculation for one of the groups – the other is identical by symmetry.

aligned candidate is given by:

$$\begin{aligned}
c \cdot a_{G_R}^*(P_L)^2 - c \cdot a_{G_R}^*(P_R)^2 &= \frac{\left((x_{G_R} - x_{P_L}) + (x_{G_R} - x_{G_L}) - \sqrt{2} \sqrt{(x_{G_R} - x_{G_L})(x_{G_R} - x_{P_L})} \right)^2}{2\sqrt{2} \sqrt{(x_{G_R} - x_{G_L})(x_{G_R} - x_{P_L})}} \\
&\quad - \frac{\left(\sqrt{2} \sqrt{(x_{G_R} - x_{G_L})(x_{P_R} - x_{G_L})} - (x_{P_R} - x_{G_L}) \right)^2}{2\sqrt{2} \sqrt{(x_{G_R} - x_{G_L})(x_{P_R} - x_{G_L})}} \\
&= \frac{(A + C - \sqrt{2AC})^2}{2\sqrt{2AC}} - \frac{(\sqrt{2AB} - B)^2}{2\sqrt{2AB}} \\
&= \frac{A^2 + 2AB - 2A\sqrt{2AB}}{2\sqrt{2AB}} \\
&= \frac{(A - \sqrt{2AB})^2}{2\sqrt{2AB}} \\
&= \frac{A(\sqrt{A} - \sqrt{2B})^2}{2\sqrt{2AB}} \\
&= \frac{2\gamma(\sqrt{2\gamma} - \sqrt{2(\pi + \gamma)})^2}{2\sqrt{2}(2\gamma(\pi + \gamma))} = \frac{\sqrt{\gamma}}{\sqrt{\pi + \gamma}} (\sqrt{\pi + \gamma} - \sqrt{\gamma})^2
\end{aligned}$$

Finally, we put the policy and cost components together for the value of winning the election under open lobbying.

$$\begin{aligned}
\Delta^O = u_{G_R}(P_R) - u_{G_R}(P_L) &= (\sqrt{A} - \sqrt{2B})^2 + \frac{A(\sqrt{A} - \sqrt{2B})^2}{2\sqrt{2AB}} \\
&= (\sqrt{A} - \sqrt{2B})^2 \left[1 + \frac{A}{2\sqrt{2AB}} \right] \\
&= (\sqrt{2B} - \sqrt{A})^2 \left[1 + \frac{\sqrt{A}}{2\sqrt{2B}} \right] \\
&= 2(\sqrt{\pi + \gamma} - \sqrt{\gamma})^2 \left[1 + \frac{\sqrt{2\gamma}}{2\sqrt{\pi + \gamma}} \right] \\
&= (\sqrt{\pi + \gamma} - \sqrt{\gamma})^2 \left[2 + \frac{\sqrt{\gamma}}{\sqrt{\pi + \gamma}} \right]
\end{aligned}$$

■

Proof of 4.1.1. The comparative statics follow straightforwardly from signing the derivatives

of Δ^O with respect to γ and π . [See attached Mathematica notebook.] ■

Proof of Lemma 5.1. With two players who share the same per-unit cost of effort, the players choose symmetric effort levels and the tug-of-war produces a policy that splits the difference between their ideal points. ■

Proof of Proposition 5.1. When there are only two groups, we have the difference in final policies being $\pi + \gamma$, though the difference in utility must account for the lobbying cost incurred when granted access and also the possibility that the final policies are more extreme than the interest groups' ideal points. In that case (i.e., $\pi > \gamma$), the difference in policy utility is 2γ . The difference in policy utilities is increasing in γ even as the function changes.

The equilibrium effort is $e = (\frac{\gamma-\pi}{2})^2 / \sqrt{2 \cdot 2(\frac{\gamma-\pi}{2})^2} = |\gamma - \pi|^2 / (4|\gamma - \pi|) = |\gamma - \pi|/4$.

The value of winning is thus is

$$\Delta^A = \begin{cases} 2\gamma - |\gamma - \pi|/4 & \text{if } \pi > \gamma \\ \gamma + \pi - |\gamma - \pi|/4 & \text{if } \pi < \gamma. \end{cases}$$

Proof of Corollary 5.1.1. The comparative statics follow from signing the derivatives of Δ^A with respect to γ and π , noting that increases in each variable holding fixed the other eventually toggles between the two cases. ■

Proof of Proposition 6.1. Spending under open lobbying is less than under no lobbying or access lobbying when $\gamma = \pi$. (See attached Mathematica notebook.)

From Corollaries 3.1.1, 4.1.1, and 5.1.1, when politicians are more polarized than interest groups, campaign spending is increasing under open lobbying but constant under no lobbying and decreasing under access lobbying, so there exists a politician polarization relative to interest group polarization, $\bar{\pi}(\gamma)$, at which spending under open lobbying is greater than

under the other two regimes. As seen in the figure, $\bar{\pi}(\gamma)$ may very well be less than 3γ , as required by the assumption that $\gamma < \pi/3$. ■

Proof of Proposition 6.2. The open lobbying policies are always in between both interest group ideal points as well as in between both politician ideal points.

If the politicians are less polarized than the interest groups, no lobbying produces more moderate ideal points than access lobbying, which would pull the policy away from the median voter. The opposite is true when politicians are more polarized than interest groups, as access lobbying pulls the policies closer to the voter's ideal point than no lobbying. ■