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Sincere Lobby Formation*

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Abstract

This paper analyzes endogenous lobbying over a unidimensional policy issue. Individuals differ in policy preferences and decide either to join one of two opposite interest lobbies or not to take part in lobbying activities. Once formed, lobbies make contributions to the incumbent government in exchange for a policy favor as in a common-agency model. A "sincere-lobby-formation" condition for equilibrium is introduced: an individual joins a lobby if their gain from the policy change that this lobby might achieve exceeds a contribution fee. Thus, an equilibrium occurs only if no lobby member would prefer their lobby to cease to exist. I show the existence of an equilibrium with two organized lobbies. Individuals with more extreme preferences are more likely to join lobbying activities. I find that lobbying somewhat moderates the government's preferences, i.e., it shifts the final policy in favor of individuals who are initially disadvantaged by the government's pro- or anti-policy preferred position. Under a utilitarian government, however, lobbying does not affect the final policy, and political competition results in a socially optimal outcome.

JEL classification: D72.

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1. Introduction

One wonders why citizens take part in lobbying when there is always a strong temptation to free-ride. In this paper, I develop a model of special interest politics, analyzing individuals' decisions to participate in lobbying to influence a policy issue. It is a complete information model with a unidimensional policy space. The incumbent government cares about policy outcomes and lobbies' contribution payments. Individuals are assumed to differ in their preferences over a policy. Two lobbies can be organized: a pro-policy lobby and an anti-policy lobby. Moreover, I assume that there is no cost of forming lobbies, and the lobbying mechanism is modeled as the common-agency problem of Bernheim and Whinston (1986), adapted to lobbying by Grossman and Helpman (1994). Each individual decides either to belong to one of the two lobbies or not to participate in lobbying activities. I propose an intuitive condition for equilibrium, termed *sincere lobby formation*: in equilibrium, an individual joins a lobby if their gain from this lobby's activities exceeds a contribution fee. In other words, an equilibrium occurs only if no lobby member would prefer their lobby to stop existing.

Why would individuals behave sincerely in forming lobby groups rather than free-ride? One possible explanation could be that individuals gain some personal satisfaction from showing allegiance to their special interest group and participate in lobbying unless they cannot afford it. Another possible answer captures the idea of social-norm individual behavior, i.e., individuals take part in lobbying activities (unless they are better off without any lobby) because it is a social norm of the society. In other words, the social norm may suggest that one should join a lobby if the gain one gets from lobbying activities is higher than the fee that one has to pay as a lobby member. Alternatively, one can think of an ethical society where individuals bear a very high psychological cost if they engage in free-riding. So, unless the gain from free-riding is very high, citizens will refrain from free-riding to avoid this psychological cost. Smith (2000), in a systematic analysis of postwar lawmaking, showed that the public does overcome the free-riding problem in the case of issues that affect the interests of the majority of the population such as tax rates, air pollution and product liability.

Note that Alesina and Rosenthal's conditional-sincerity condition for voter equilibrium applies a similar concept in the context of voting (Alesina and Rosenthal 1995, 1996). On the other hand, the sincere-lobby-formation condition is somewhat related to a "group rule-utilitarian" approach to voter turnout (Coate and Conlin 2004, Feddersen and Sandroni 2002, Harsanyi 1980). According to this approach, individuals follow the voting rule that, if followed by everyone else in their group, would maximize their group's aggregate utility.

Another related concept is Kantian equilibrium (Roemer 2010). In Kantian equilibrium, "nobody would prefer that everybody change their efforts by the same factor." In other words, "one should take those actions and only those actions that one would advocate all others take as well."[1] I stress, however, that in my model individuals are motivated by ethical norms rather than group rule-utilitarian considerations or Kant's morals.

I show that there exists an equilibrium with two organized lobbies. Individuals with more extreme preferences are more likely to be involved in lobbying activities. To be more specific, in equilibrium, each lobby is characterized by a threshold level of preferences such that all individuals with more pro-policy views (for the pro-policy lobby) or more anti-policy views (for the anti-policy lobby) participate in lobbying activities. This is in line with the results of Glazer and Gradstein (2005) and McCarty et al. (2006) that extremists want to contribute the most.

I find that lobbying moderates the government's preferences and shifts the final policy outcome in favor of individuals who are initially disadvantaged by the government's pro- or anti-policy preferred position.

Intuitively, consider the case of a pro-policy government. Individuals with preferences similar to the government's have less stake in the policy, since they are initially favored by the government's preferred policy. Anti-policy individuals, however, are disadvantaged by the government's preferences. Owing to the concavity of preferences, anti-policy individuals gain more than pro-policy individuals from the same (in absolute value) policy change. Therefore, they are willing to contribute more to the government for a policy change. As a result, under a pro-policy government, the anti-policy lobby is more numerous and contributes more than the pro-policy lobby. The equilibrium policy level is more moderate than the one preferred by the pro-policy government prior to lobbying, and thus favors anti-policy individuals. A similar argument, in reverse, applies to the case of an anti-policy government, under which the equilibrium policy level favors pro-policy individuals.

Under a utilitarian government, lobbying does not affect the policy outcome. In this case the lobbies "neutralize" one another, so that the pro-policy lobby's bids are matched in the equilibrium by the anti-policy lobby's bids, and political competition results in a socially optimal outcome. However, each lobby makes a positive contribution to the government to avoid an undesired policy promoted by a competitor.

Summing up, this paper first introduces a new condition for lobby formation equilibrium, namely, *sincere lobby formation*: in equilibrium, an individual joins a lobby if their gain

[1] See Roemer (2010), p. 2.

from this lobby's activities exceeds the contribution fee. Second, I show that lobbying favors individuals who are initially disadvantaged by the government's pro- or anti-policy preferred position. In other words, lobbies act as moderators of the government's preferences. Finally, I find that under a utilitarian government, lobbying does not affect the final policy, and political competition results in a socially optimal outcome. Nonetheless, lobbies have to contribute to the government in order to maintain this policy level.

This paper follows the most prevalent approach in the formal literature, based on the assumption that lobbies influence political decisions through contributions (Baron 1989, Becker 1983, 1985, Snyder 1990). Reviews of this and alternative approaches can be found in Austen-Smith (1997), Grossman and Helpman (2001), and Persson and Tabellini (2002). I use the common-agency model of Bernheim and Whinston (1986) applied to lobbying by Grossman and Helpman (1994). Lobbying is modeled as a "menu auction", where lobbies confront government with contribution schedules that map any possible policy into a contribution payment. Several authors have applied the common-agency model of lobbying to study trade policy, commodity taxation, the provision of local public goods, and other policies (Dixit et al. 1997, Grossman and Helpman 1996, Helpman and Persson 2001, Persson 1998).

This paper complements the literature on collective action and lobby organization, which dates back to the seminal work of Olson (1965). Recent contributions have addressed the question of lobby formation in several different contexts. Some authors have focused mainly on the formation of lobbies from exogenously given special interest groups with a fixed cost (Drazen et al. 2007, Felli and Merlo 2006, 2007, Laussel 2006, Leaver and Makris 2006, Mitra 1999, Redoano 2010). Others have in some way addressed the problem of individuals' decisions to lobby. For example, Damania and Fredriksson (2000, 2003) and Magee (2002) analyzed incentives for two firms and for n identical firms, respectively, to organize into a single industry lobby to affect policy outcomes. In turn, Bombardini (2008) proposed an "optimal lobby criterion" that reads as follows: it is optimal for a firm to "join the lobby" if the joint surplus of a prospective member firm and the lobby is higher under participation of the firm. Anesi (2009) analyzed the impact of moral hazard in teams on collective action. Furusawa and Konishi (2010) suggested a "free-riding-proof core" solution concept for the problem of the provision of public goods, which determines the formation of a contribution group, the level of provision of public goods, and the allocation of payoffs within the group. There is, however, an important difference between the present work and the papers just cited. In this paper, I study endogenous lobby formation, where individuals participate in lobbying once the gain from it exceeds the contribution fee. The model presented here thus aims not to solve the free-riding problem but rather to study lobby formation in a society where, because of ethical norms, some individuals do not free-ride.

The rest of the paper is organized as follows. Section 2 lays out a model. Section 3 describes the common-agency model of lobbying. Section 4 develops the concept of sincere lobby formation. Section 5 establishes the existence of an equilibrium with two organized lobbies. Finally, Section 6 concludes the paper.

2. Model

Suppose that a certain policy option y is available to a society. Think of this as a public project (e.g. a hospital) or a piece of legislation (e.g. an abortion law). The set of feasible policies is the closed interval $[0,1]$, where $y=0$ stands for the lowest policy level (e.g. no hospital financing or no legal abortion) and $y=1$ stands for the highest policy level (e.g. a public hospital or no restrictions on abortion).

The society is inhabited by a large number (formally a continuum) of individuals, where the size (mass) of the population is normalized to unity. Individuals differ in their policy preferences. Denote by $x \in [0,1]$ an individual's preferred policy outcome. (In what follows, I refer to an individual with an ideal policy x as "individual x".) For ease of exposition, x is assumed to be distributed in the population uniformly with density 1.[2] Individual x's utility from policy y is given by

$$u_x(y) = -(x-y)^2 + m,$$

where m stands for the amount of money that the individual has.

The incumbent government decides on a policy outcome y. I assume that the government cares about the policy outcome and about money. Formally, denote by $\gamma \in \Gamma \subset [0,1]$ the government's preferred policy outcome.[3] If $\gamma < 0.5$, the individuals face an anti-policy government; if $\gamma = 0.5$, the government is utilitarian; if $\gamma > 0.5$, the government is pro-policy. The government's preferences are represented by

$$U_\gamma(y) = -(\gamma - y)^2 + M,$$

where M denotes the government's monetary payoff. It is reasonable to assume that the government's preferences are moderate such that the domain Γ does not include very extreme

[2] The qualitative results of this analysis hold for a smooth, well-behaved, symmetric cumulative distribution function. The assumption of a uniform distribution has been made because it considerably simplifies the analysis.

[3] One can think of a situation where an office holder is a "citizen-candidate" (as in Besley and Coate 1997 or Osborne and Slivinski 1996) with a preferred policy outcome γ.

policy levels.[4] This assumption is formalized in (4.1) in Section 4.

Policy-making involves not only government decision-making but also special interest politics, or lobbying. Lobbying is modeled here as a two-stage game. The first stage of the game is a lobby formation stage, where individuals decide either to participate in lobbying activities or not. The second stage of the game is a contribution game, where lobbies (organized in the first stage) offer the government contributions to affect the policy outcome. The game is described in detail in the following subsections.

2.1. First Stage: Lobby Formation

I assume that just two lobbies can be formed: a lobby of pro-policy individuals, given by a set P, and a lobby of anti-policy individuals, given by a set A. Lobby P's goal is to defend the special interests of the individuals who are in favor of the policy, while lobby A aims to defend the special interests of the individuals who prefer low policy levels.

Suppose further that, once formed, these lobbies care about the aggregate utility of their members. Thus, their gross objective functions are given by

$$\begin{aligned} U_P(y) &= \int_{x \in P} u_x(y)\, dx, \\ U_A(y) &= \int_{x \in A} u_x(y)\, dx. \end{aligned}$$

Each individual's choice is either to be a member of one of two lobbies, P or A, or not to participate in lobbying activities at all. I assume that each individual can belong just to one lobby, since in the model lobbies represent opposite interests. There is no fixed cost of forming lobbies. If an individual belongs to a lobby, that individual's utility is taken into account in the lobby's objective function, but the individual should pay a contribution fee.

How do individuals solve the coordination problem when making their choice? The individuals here are assumed to be ethical and faithful to their special interest group. The coordination then has a simple form that I call *sincere lobby formation*. The *sincere-lobby-formation condition* is that in equilibrium, individuals join a lobby if their gain from lobbying activities exceeds the contribution fee. In other words, an equilibrium occurs only if no lobby member would prefer their lobby to cease to exist. Intuitively, if a lobby member would like their lobby to cease to exist, then they are "lobbying" in the "wrong" way given their expectations and preferences.[5]

[4] This assumption reflects the idea that candidates with extreme views have less electoral support and are less likely to be elected than ones with moderate preferences.

[5] Alternatively, one can think of a society inhabited by individuals of two types. The first type of individuals

2.2. Second Stage: Contribution Game

I focus on lobbying activities in the context of the common-agency model of Bernheim and Whinston (1986), adapted to lobbying by Grossman and Helpman (1994). In this approach, lobbying is modeled as a "menu auction", where lobbies confront government with contribution schedules that map any possible policy into a contribution payment.

First, each lobby $i \in \{P, A\}$, noncooperatively and simultaneously, presents its common agent, the government, with a contribution schedule $C_i(y)$, giving a binding promise of payment conditional on a chosen policy level y. Following the literature cited in the previous paragraph, I concentrate on (globally) truthful contribution schedules that satisfy

$$C_i(y) = \max\left[U_i(y) - b_i, 0\right],$$

where b_i is a constant chosen optimally by lobby i. So lobbies reveal their true preferences: they contribute to the government the maximum amount that they are willing to exchange for the government's decision. The objective of lobby i is to maximize the net utility of its members, namely

$$U_i(y) - C_i(y).$$

Second, the government sets y to maximize its utility, where its monetary payoff M is exactly equal to the lobbies' contributions:

$$-(\gamma - y)^2 + C_P(y) + C_A(y). \tag{2.1}$$

An equilibrium of the game is a subgame perfect Nash equilibrium in the contribution schedules, the chosen policy and the lobbies' compositions. In the following section, the game is analyzed backwards. First, I solve for the policy level and lobbies contributions. Second, I examine the individuals' choice of participating in lobbying activities.

3. Common-Agency Lobbying

Suppose that two lobbies P and A have been formed. To derive an equilibrium in truthful strategies, the following lemma is used. (See Bernheim and Whinston 1986 and Dixit et al. 1997 for a proof.)

Lemma 1. *The equilibrium policy is Pareto optimal in the bilateral relation between the government and each lobby.*

are free-riders: they never participate in lobbying activities. The second type of individuals are ethical and faithful to their special interest group: they join a lobby if the gain they get from lobbying activities exceeds the contribution fee. The qualitative analysis remains the same for this alternative interpretation of the model.

Therefore, the equilibrium policy maximizes the sum of the lobbies' net objective functions

$$\sum_{i\in\{P,A\}} \left(U_i\left(y\right) - C_i\left(y\right)\right)$$

and the government's objective (2.1). This sum equals

$$-\left(\gamma - y\right)^2 + U_P\left(y\right) + U_A\left(y\right). \tag{3.1}$$

A first-order condition of (3.1) yields the equilibrium policy level y^*:

$$y^* = \arg\max_{y\in[0,1]} \left(-\left(\gamma - y\right)^2 + U_P\left(y\right) + U_A\left(y\right)\right).$$

To find the contribution levels in the equilibrium, define y^j to be the policy that would emerge if the contribution offered by lobby i were zero, $i, j \in \{P, A\}$, $j \neq i$. So,

$$\begin{aligned} y^P &= \arg\max_{y\in[0,1]} \left(-\left(\gamma - y\right)^2 + U_P\left(y\right)\right), \\ y^A &= \arg\max_{y\in[0,1]} \left(-\left(\gamma - y\right)^2 + U_A\left(y\right)\right). \end{aligned} \tag{3.2}$$

In other words, y^j is the policy that would emerge if lobby i were not formed.

Lobby i will raise the constant b_i in its truthful contribution schedule to the point where the government is just indifferent between choosing policy y^j and choosing the equilibrium policy y^*, i.e.,

$$\begin{aligned} -\left(\gamma - y^A\right)^2 + C_A\left(y^A\right) &= -\left(\gamma - y^*\right)^2 + C_P\left(y^*\right) + C_A\left(y^*\right), \\ -\left(\gamma - y^P\right)^2 + C_P\left(y^P\right) &= -\left(\gamma - y^*\right)^2 + C_P\left(y^*\right) + C_A\left(y^*\right). \end{aligned}$$

Now one can solve for the lobbies' contributions in equilibrium. The following proposition summarizes the results of the lobbies' common-agency contribution game. Proofs of this and other propositions are given in the Appendix.

Proposition 1. *There exists an equilibrium in truthful strategies such that the equilibrium policy level is given by*

$$y^* = \arg\max_{y\in[0,1]} \left(-\left(\gamma - y\right)^2 + U_P\left(y\right) + U_A\left(y\right)\right).$$

The lobbies' equilibrium contributions are equal to

$$\begin{aligned} C_P^* &\equiv C_P\left(y^*\right) = -\left(\gamma - y^A\right)^2 + \left(\gamma - y^*\right)^2 + U_A\left(y^A\right) - U_A\left(y^*\right), \\ C_A^* &\equiv C_A\left(y^*\right) = -\left(\gamma - y^P\right)^2 + \left(\gamma - y^*\right)^2 + U_P\left(y^P\right) - U_P\left(y^*\right). \end{aligned}$$

If there is just one organized lobby, the government derives exactly the same utility as it would have achieved without any contribution. Thus, a lobby that faces no competition captures the entire surplus from lobbying activities. If two lobbies compete for the final policy, the government captures some surplus from lobbying activities, and each lobby pays according to the political strength of its rival.

The lobby formation stage of the game is analyzed in the following section.

4. Sincere Lobby Formation

The *sincere-lobby-formation condition* requires that an equilibrium occurs only if no lobby member would prefer their lobby to cease to exist. In other words, it implies that individuals behave ethically – they do not free-ride. So an individual joins a lobby if their gain from the policy change that this lobby might achieve exceeds a contribution fee, which is assumed to be the same for all the lobby members.[6] Formally, the sincere-lobby-formation condition reads

$$\begin{aligned} \text{if } x \text{ belongs to lobby } P\text{, then } u_x\left(y^*\right) - u_x\left(y^A\right) &> \frac{C_P^*}{\int_{z\in P} f\left(z\right) dz}; \\ \text{if } x \text{ belongs to lobby } A\text{, then } u_x\left(y^*\right) - u_x\left(y^P\right) &> \frac{C_A^*}{\int_{z\in A} f\left(z\right) dz}. \end{aligned}$$

Two definitions are now introduced.

Definition 1. *An indifferent pro-policy individual π is an individual whose gain from P's lobbying equals P's contribution fee. Formally,*

$$u_\pi\left(y^*\right) - u_\pi\left(y^A\right) = \frac{C_P^*}{\int_{z\in P} f\left(z\right) dz}.$$

Definition 2. *An indifferent anti-policy individual α is an individual whose gain from A's lobbying equals A's contribution fee. Formally,*

$$u_\alpha\left(y^*\right) - u_\alpha\left(y^P\right) = \frac{C_A^*}{\int_{z\in A} f\left(z\right) dz}.$$

The following proposition characterizes the lobbies' compositions in equilibrium. The proof of the proposition uses the fact that lobby P's members prefer high policy levels while lobby A's members prefer low policy levels. To reflect this conceptual difference between the two lobbies, it is required that in equilibrium lobby P and lobby A make contributions to

[6] In this quasi-linear model, it is reasonable to assume that the contributions should be proportional to the marginal utility of money, which is the same for all individuals.

the government in order to raise and to lower, respectively, the final policy outcome, i.e., $y^A \leq y^* \leq y^P$.

Proposition 2. *If in equilibrium there exist lobby P and lobby A, then*

$$\begin{aligned} P &= \{x \mid x \in (\pi, 1]\}, \\ A &= \{x \mid x \in [0, \alpha)\}. \end{aligned}$$

Intuitively, since for indifferent individuals π and α the gain from lobbying equals the contribution fee, then for individuals with more extreme preferences the gain from the policy change promoted by the corresponding lobby is definitely greater than the contribution fee (which is the same for all the lobby members). These individuals behave ethically, they do not free-ride, and thus they take part in lobbying.

To reflect the fact that in equilibrium each individual can belong either to one or to no lobby, the restriction $\alpha \leq \pi$ is imposed. Furthermore, to formalize the assumption that the government's preferences are moderate (Section 2), I consider the following domain for the government's preferred policy:

$$\Gamma = \{\gamma \mid \gamma \in [\alpha, \pi]\}. \tag{4.1}$$

The lobbies' gross objective functions read

$$\begin{aligned} U_P(y, \pi) &= \int_\pi^1 u_x(y)\, dx = -(1-\pi)\, y^2 + \left(1-\pi^2\right) y - \frac{1}{3}\left(1-\pi^3\right) + m(1-\pi), \\ U_A(y, \alpha) &= \int_0^\alpha u_x(y)\, dx = -\alpha y^2 + \alpha^2 y - \frac{1}{3}\alpha^3 + m\alpha. \end{aligned}$$

Then Proposition 1 and (3.2) imply the following corollary (the proof is straightforward).

Corollary 1. *The equilibrium policy level with two organized lobbies P and A is equal to*

$$y^*(\pi, \alpha, \gamma) = \frac{1+\alpha^2-\pi^2+2\gamma}{2(2+\alpha-\pi)}.$$

The policies that would emerge if one of the lobbies did not contribute are given by

$$\begin{aligned} y^P(\pi, \gamma) &= \frac{1-\pi^2+2\gamma}{2(2-\pi)}, \\ y^A(\alpha, \gamma) &= \frac{\alpha^2+2\gamma}{2(1+\alpha)}. \end{aligned}$$

The lobbies' equilibrium contributions in the case of two organized lobbies P and A are equal to

$$\begin{aligned} C_P^*(\pi, \alpha, \gamma) &= \frac{(1-\pi)^2\left(1+\alpha+\pi+\pi\alpha-\alpha^2-2\gamma\right)^2}{4(1+\alpha)(2+\alpha-\pi)^2}, \\ C_A^*(\pi, \alpha, \gamma) &= \frac{\alpha^2\left(1-2\alpha+\pi\alpha-\pi^2+2\gamma\right)^2}{4(2-\pi)(2+\alpha-\pi)^2}. \end{aligned}$$

In what follows, I show the existence of nonempty organized lobbies P and A, i.e., I find π and α such that $0 < \alpha \leq \gamma \leq \pi < 1$.

5. Equilibrium

The following proposition establishes the existence of an equilibrium with two organized lobbies.

Proposition 3. *For the government's preferred policy* $\gamma \in [0.3, 0.7]$*, there exists an equilibrium with two nonempty lobbies* P *and* A *such that*

$$\begin{aligned} P &= \{x \mid x \in (\pi^*(\gamma), 1]\}, \\ A &= \{x \mid x \in [0, \alpha^*(\gamma))\}, \end{aligned}$$

where $\pi^*(\cdot)$ *and* $\alpha^*(\cdot)$ *are implicit functions of* γ *that satisfy*

$$\begin{aligned} 1 + \alpha^* + \alpha^{*2} + 2\gamma - 3\pi^*(1 + \alpha^*) &= 0, \\ 1 - \pi^{*2} + 2\gamma - 3\alpha^*(2 - \pi^*) &= 0. \end{aligned}$$

Figure 1 depicts the shapes of the curves

$$\begin{aligned} 1 + \alpha + \alpha^2 + 2\gamma - 3\pi(1 + \alpha) &= 0, \\ 1 - \pi^2 + 2\gamma - 3\alpha(2 - \pi) &= 0 \end{aligned} \tag{5.1}$$

for different levels of the government's preferred policy γ. The shaded area represents $\alpha \leq \gamma \leq \pi$. In Figures 1a and 1c, the solution to (5.1) does not satisfy $\alpha \leq \gamma \leq \pi$. Indeed, the intersection of the curves (5.1) does not lie in the shaded area. In Figure 1b, however, the solution to (5.1) lies in the shaded area and thus yields an equilibrium $\pi^*(\gamma)$, $\alpha^*(\gamma)$, which satisfies $\alpha^*(\gamma) \leq \gamma \leq \pi^*(\gamma)$. Numerical solution of this inequality yields $\gamma \in [0.3, 0.7]$.

Note that this is a unique equilibrium with two organized lobbies.[7] The implicit function theorem is used in the proof. In what follows, I apply this theorem again to provide comparative-statics results.

[7] There are also equilibria where no lobbies are organized (i.e., $\pi^* = 1$, $\alpha^* = 0$), where one pro-policy lobby is organized (i.e., $\pi^* = \frac{1}{3} + \frac{2}{3}\gamma$, $\alpha^* = 0$) and where one anti-policy lobby is organized (i.e., $\pi^* = 1$, $\alpha^* = \frac{2}{3}\gamma$). The comparative statics for these equilibria is quite straightforward, so I skip it and concentrate the analysis on the equilibrium where there are two organized lobbies.

Proposition 4. *The more pro-policy the government, the less numerous the pro-policy lobby P and the more numerous the anti-policy lobby A are, i.e.,*

$$\begin{aligned}\frac{d(1-\pi^*)}{d\gamma} &< 0,\\ \frac{d\alpha^*}{d\gamma} &> 0.\end{aligned}$$

Moreover, the more pro-policy the government, the higher the equilibrium policy level, i.e.,

$$\frac{dy^*}{d\gamma} > 0.$$

Finally, the more pro-policy the government, the lower the pro-policy lobby P's equilibrium contribution and the greater the anti-policy lobby A's contribution, i.e.,

$$\begin{aligned}\frac{dC_P^*}{d\gamma} &< 0,\\ \frac{dC_A^*}{d\gamma} &> 0.\end{aligned}$$

Figure 2 depicts the lobbies' equilibrium compositions and the equilibrium policy level y^* for the government's preferred policy $\gamma \in [0.3, 0.7]$. Figure 3 presents the lobbies' equilibrium contributions for $\gamma \in [0.3, 0.7]$.

Corollary 2. *Under an anti-policy government, the pro-policy lobby P is more numerous and contributes more than the anti-policy lobby A. Lobbying favors pro-policy individuals, i.e., the equilibrium policy level is greater than the government's preferred level (the policy level that would emerge without lobbying):*

$$1-\pi^* > \alpha^*, \quad C_P^* > C_A^* \quad \text{and} \quad y^* > \gamma \quad \text{for} \quad \gamma < 0.5.$$

Under a pro-policy government, the pro-policy lobby P is less numerous and contributes less than the anti-policy lobby A. Lobbying favors anti-policy individuals, i.e., the equilibrium policy level is lower than the government's preferred level:

$$1-\pi^* < \alpha^*, \quad C_P^* < C_A^* \quad \text{and} \quad y^* < \gamma \quad \text{for} \quad \gamma > 0.5.$$

Under a utilitarian government, the lobbies are of the same size and contribute the same amount to the government. Lobbying does not affect the policy outcome, i.e., the equilibrium policy level is equal to the government's preferred level:

$$1-\pi^* = \alpha^*, \quad C_P^* = C_A^* \quad \text{and} \quad y^* = \gamma \quad \text{for} \quad \gamma = 0.5.$$

Thus, lobbying somewhat moderates the government's preferences and favors those individuals who are initially disadvantaged by the government's preferred policy. Consider a nonutilitarian government (either anti- or pro-policy). Then individuals whose preferences differ considerably from the government's have more stake in the policy than individuals with preferences similar to the government's. In other words, owing to the concavity of preferences, "disadvantaged" individuals are willing to pay more than "favored" individuals for the same (in absolute value) policy change. As a result, the lobby of "disadvantaged" individuals is more numerous and contributes more than the lobby of initially "favored" individuals. And the final policy goes in favor of the lobby with higher relative political strength, i.e., the lobby of individuals who are initially disadvantaged by the government's preferred policy.

Under a utilitarian government, lobbying does not affect the policy outcome. In this case the lobbies "neutralize" one another, so that in equilibrium P's bids for a higher policy level are matched by A's bids for a lower policy level, and political competition results in a socially optimal outcome. Nonetheless, each lobby must make a positive contribution in order to induce the government to choose this outcome rather than one that would be worse from that lobby's perspective.

The literature claims that the institute of lobbying favors richer strata of a society (Domhoff 1983, Mills 1956). However, the results presented here indicate that it is not welfare that determines the outcome of lobbying. My model of sincere lobby formation predicts that lobbying over a particular policy issue favors individuals with more stake in that policy, i.e., individuals who are initially disadvantaged by the government's preferences. These individuals are ready to contribute more to the government for a policy favor than are the individuals favored by the government's preferred policy.

Note that the equilibrium policy level under a pro-policy government is higher than that under an anti-policy government, with or without lobbying. Therefore, the pro-policy individuals would prefer a pro-policy government to an anti-policy one in spite of the fact that under the latter they could influence the final policy in their favor by lobbying. In turn, the anti-policy individuals would prefer an anti-policy government to a pro-policy one, even when they could lobby more successfully under a pro-policy government.

6. Conclusion

The paper has studied the impact of lobbying on government decision-making. I propose a new equilibrium condition for lobby formation, namely, *sincere lobby formation*: a citizen joins a lobby group if their gain from the policy change that this lobby might achieve exceeds the contribution fee. This implies that an equilibrium occurs only if no lobby member would prefer their lobby to stop existing. Lobbying is modeled as a common-agency problem, only two lobbies can be organized, and there is no cost of forming lobbies.

The analysis shows that there exists an equilibrium where there are two lobbies, which make positive contributions to the government in exchange for a policy favor. The model predicts that individuals with more extreme preferences are more likely to participate in lobbying. Lobbying somewhat moderates the government's preferences and favors individuals who are initially disadvantaged by the government's preferred policy. Indeed, under a pro-policy government, lobbying favors anti-policy individuals, i.e., the final policy outcome is somewhat more moderate than the one initially preferred by the pro-policy policymakers. Under an anti-policy government, lobbying moderates the final policy in favor of pro-policy individuals. In the case of a utilitarian government, lobbying does not affect the final policy, and political competition results in a socially optimal outcome. However, each lobby has to contribute the same amount to the government to maintain this policy level.

I have focused on a unidimensional policy. However, in reality, public policies pursue many goals. So it is of interest to study sincere lobby formation under the more realistic assumption of a multidimensional policy space, where an equilibrium might fail to exist. It would also be interesting to consider a nonsymmetric distribution of preferences. In this case, I expect that the qualitative results presented above will still hold (except, probably, those for the case of a utilitarian government). These tasks are left for future research.

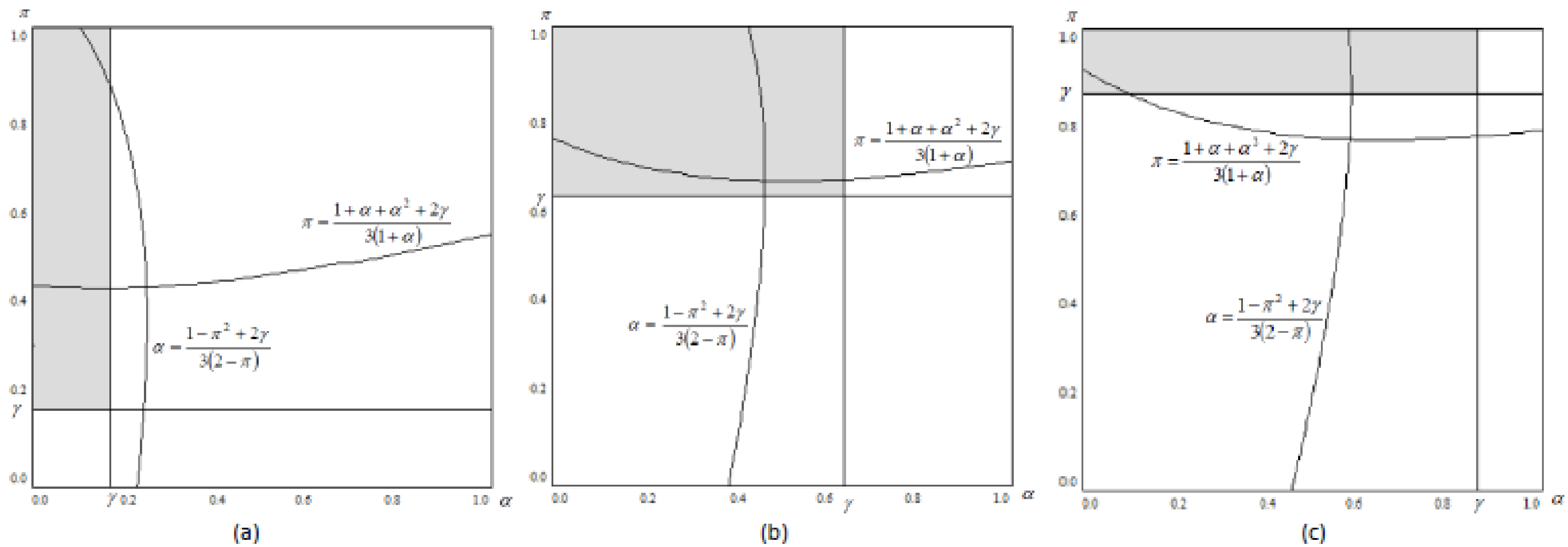

Figure 1. π as a function of α and α as a function of π for different levels of the government's preferred policy γ.

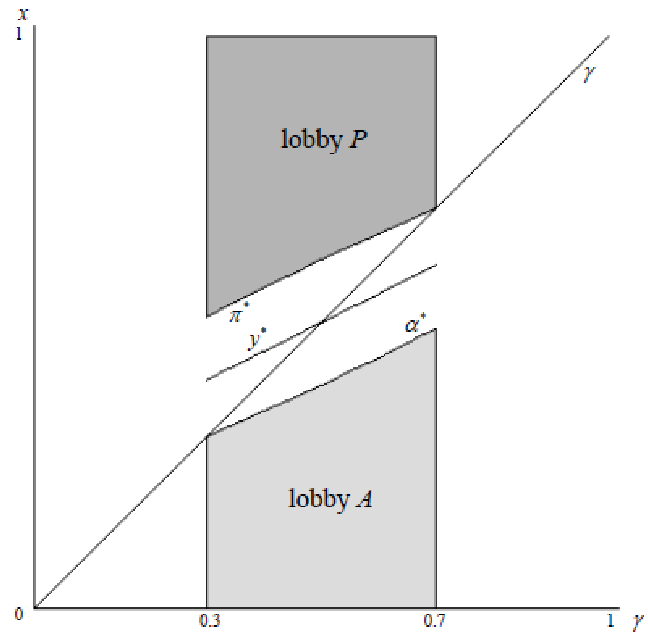

Figure 2. Equilibrium compositions of lobbies P and A and equilibrium policy level y^* for the government's preferred policy $\gamma \in [0.3, 0.7]$.

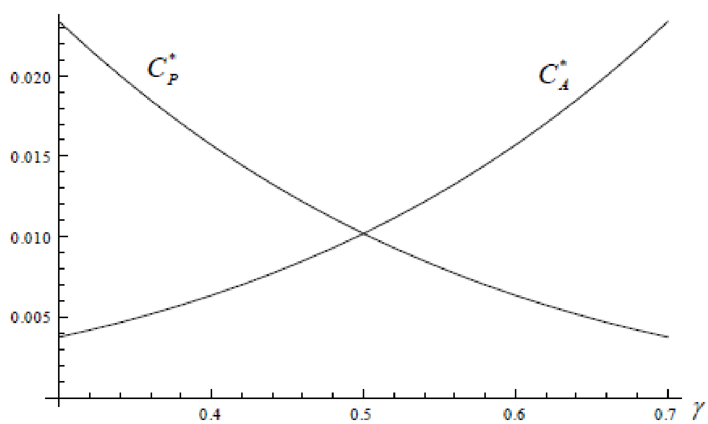

Figure 3. Equilibrium contributions of lobbies P and A for the government's preferred policy $\gamma \in [0.3, 0.7]$.

Appendix

A. Proof of Proposition 1

The lobbies' truthful contribution schedules are

$$\begin{aligned} C_P(y) &= \max\left[U_P(y) - b_P, 0\right], \\ C_A(y) &= \max\left[U_A(y) - b_A, 0\right]. \end{aligned} \tag{A.1}$$

The constants b_P and b_A in the lobbies' truthful contribution schedules satisfy

$$\begin{aligned} -\left(\gamma - y^A\right)^2 + C_A\left(y^A\right) &= -\left(\gamma - y^*\right)^2 + C_P\left(y^*\right) + C_A\left(y^*\right), \\ -\left(\gamma - y^P\right)^2 + C_P\left(y^P\right) &= -\left(\gamma - y^*\right)^2 + C_P\left(y^*\right) + C_A\left(y^*\right). \end{aligned} \tag{A.2}$$

Plugging (A.1) into (A.2) yields

$$\begin{aligned} U_P\left(y^*\right) - b_P &= -\left(\gamma - y^A\right)^2 + \left(\gamma - y^*\right)^2 + U_A\left(y^A\right) - U_A\left(y^*\right), \\ U_A\left(y^*\right) - b_A &= -\left(\gamma - y^P\right)^2 + \left(\gamma - y^*\right)^2 + U_P\left(y^P\right) - U_P\left(y^*\right), \end{aligned}$$

where the first line is lobby P's equilibrium contribution C_P^*, and the second line is lobby A's equilibrium contribution C_A^*. ■

B. Proof of Proposition 2

Assume that in equilibrium there exists lobby P. Then

$$P = \left\{ x \mid u_x\left(y^*\right) - u_x\left(y^A\right) > \frac{C_P^*}{\int_{z\in P} f(z)\,dz} \right\}.$$

Taking into account the fact that $y^A \leq y^*$, the above inequality yields

$$x > \frac{1}{2}\left(y^* + y^A + \frac{1}{y^* - y^A} \frac{C_P^*}{\int_{z\in P} f(z)\,dz} \right).$$

The definition of an indifferent pro-policy individual π yields

$$\pi = \frac{1}{2}\left(y^* + y^A + \frac{1}{y^* - y^A} \frac{C_P^*}{\int_{z\in P} f(z)\,dz} \right).$$

The last two equations imply that in equilibrium, lobby P satisfies

$$P = \left\{ x \mid x \in (\pi, 1] \right\}.$$

By analogy, if in equilibrium there exists lobby A, then

$$A = \left\{ x \mid u_x\left(y^*\right) - u_x\left(y^P\right) > \frac{C_A^*}{\int_{z \in A} f\left(z\right) dz} \right\}.$$

Taking into account the fact that $y^* \leq y^P$ and the definition of an indifferent anti-policy individual α, the above inequality yields

$$x < \frac{1}{2}\left(y^P + y^* + \frac{1}{y^P - y^*} \frac{C_A^*}{\int_{z \in A} f\left(z\right) dz} \right) = \alpha.$$

Therefore, in equilibrium, lobby A satisfies

$$A = \left\{ x \mid x \in [0, \alpha) \right\}. \blacksquare$$

C. Proof of Proposition 3

By the definition of indifferent pro- and anti-policy individuals π and α,

$$\begin{aligned} u_\pi\left(y^*\left(\pi, \alpha, \gamma\right)\right) - u_\pi\left(y^A\left(\alpha, \gamma\right)\right) &= \frac{C_P^*\left(\pi, \alpha, \gamma\right)}{\int_\pi^1 dz}, \\ u_\alpha\left(y^*\left(\pi, \alpha, \gamma\right)\right) - u_\alpha\left(y^P\left(\pi, \gamma\right)\right) &= \frac{C_A^*\left(\pi, \alpha, \gamma\right)}{\int_0^\alpha dz}. \end{aligned}$$

Plugging in the expressions for $y^*\left(\pi, \alpha, \gamma\right)$, $y^P\left(\pi, \gamma\right)$, $y^A\left(\alpha, \gamma\right)$, $C_P^*\left(\pi, \alpha, \gamma\right)$ and $C_A^*\left(\pi, \alpha, \gamma\right)$ from Corollary 1 yields a system of two equations with two unknowns π and α:

$$\begin{aligned} \frac{\left(1-\pi\right)^2\left(1+\alpha+\pi+\pi\alpha-\alpha^2-2\gamma\right)\left(-1-\alpha-\alpha^2+3\pi+3\pi\alpha-2\gamma\right)}{4\left(2+\alpha-\pi\right)\left(1+\alpha\right)^2} &= 0, \\ \frac{\alpha^2\left(-1+\pi^2+6\alpha-3\pi\alpha-2\gamma\right)\left(-1+\pi^2+2\alpha-\pi\alpha-2\gamma\right)}{4\left(2+\alpha-\pi\right)\left(2-\pi\right)^2} &= 0. \end{aligned} \quad \text{(C.1)}$$

Note that

$$\begin{aligned} \frac{1+\alpha+\pi+\pi\alpha-\alpha^2-2\gamma}{4\left(2+\alpha-\pi\right)\left(1+\alpha\right)^2} &\neq 0, \\ \frac{-1+\pi^2+2\alpha-\pi\alpha-2\gamma}{4\left(2+\alpha-\pi\right)\left(2-\pi\right)^2} &\neq 0 \end{aligned}$$

for $0 < \alpha \leq \gamma \leq \pi < 1$. Therefore, (C.1) simplifies to

$$\begin{aligned} \pi = 1, &\quad 1+\alpha+\alpha^2+2\gamma-3\pi\left(1+\alpha\right) = 0, \\ \alpha = 0, &\quad 1-\pi^2+2\gamma-3\alpha\left(2-\pi\right) = 0, \end{aligned}$$

and yields the following solutions:

1. $\pi = 1$, $\alpha = 0$ – no lobbies organized.

2. $\pi = 1$, $\alpha = \frac{2}{3}\gamma$ – one anti-policy lobby organized.

3. $\pi = \frac{1}{3} + \frac{2}{3}\gamma$, $\alpha = 0$ – one pro-policy lobby organized.

4. π, α such that

$$\begin{aligned} 1+\alpha+\alpha^2+2\gamma-3\pi(1+\alpha) &= 0, \\ 1-\pi^2+2\gamma-3\alpha(2-\pi) &= 0 \end{aligned} \tag{C.2}$$

– two lobbies organized.

Consider the last case, where there are two organized lobbies. Note that the functions (C.2) have continuous partial derivatives with respect to γ, π and α. Moreover, the following Jacobian determinant is nonzero:

$$|J| \equiv \begin{vmatrix} \frac{\partial\left(1+\alpha+\alpha^2+2\gamma-3\pi(1+\alpha)\right)}{\partial\pi} & \frac{\partial\left(1+\alpha+\alpha^2+2\gamma-3\pi(1+\alpha)\right)}{\partial\alpha} \\ \frac{\partial\left(1-\pi^2+2\gamma-3\alpha(2-\pi)\right)}{\partial\pi} & \frac{\partial\left(1-\pi^2+2\gamma-3\alpha(2-\pi)\right)}{\partial\alpha} \end{vmatrix} = 18-7\pi-6\pi^2+15\alpha+4\pi\alpha-6\alpha^2,$$

which is strictly positive for $0 < \alpha \leq \pi < 1$. Then, by the implicit function theorem, the equilibrium values $\pi^*(\gamma)$ and $\alpha^*(\gamma)$ are implicit functions of γ that satisfy (C.2).

Figure 1 depicts the behavior of the functions (C.2) for different levels of the government's preferred policy γ. (The shaded area corresponds to $\alpha \leq \gamma \leq \pi$.) An equilibrium exists for moderate levels of γ such that $\alpha^*(\gamma) \leq \gamma \leq \pi^*(\gamma)$. First, $\alpha^*(\gamma) \leq \gamma$ yields numerically $\gamma \geq 0.299554 \approx 0.3$. Second, $\gamma \leq \pi^*(\gamma)$ yields numerically $\gamma \leq 0.700446 \approx 0.7$. Thus, an equilibrium $\pi^*(\gamma)$, $\alpha^*(\gamma)$ exists for $\gamma \in [0.3, 0.7]$. ■

D. Proof of Proposition 4

I use the implicit function theorem to find

$$\frac{d\pi^*}{d\gamma} = \frac{1}{|J|}\begin{vmatrix} -\frac{\partial\left(1+\alpha+\alpha^2+2\gamma-3\pi(1+\alpha)\right)}{\partial\gamma} & \frac{\partial\left(1+\alpha+\alpha^2+2\gamma-3\pi(1+\alpha)\right)}{\partial\alpha} \\ -\frac{\partial\left(1-\pi^2+2\gamma-3\alpha(2-\pi)\right)}{\partial\gamma} & \frac{\partial\left(1-\pi^2+2\gamma-3\alpha(2-\pi)\right)}{\partial\alpha} \end{vmatrix} = \frac{14-12\pi+4\alpha}{18-7\pi-6\pi^2+15\alpha+4\pi\alpha-6\alpha^2},$$

which is strictly positive for $0 < \alpha \leq \pi < 1$, and

$$\frac{d\alpha^*}{d\gamma} = \frac{1}{|J|}\begin{vmatrix} \frac{\partial\left(1+\alpha+\alpha^2+2\gamma-3\pi(1+\alpha)\right)}{\partial\pi} & -\frac{\partial\left(1+\alpha+\alpha^2+2\gamma-3\pi(1+\alpha)\right)}{\partial\gamma} \\ \frac{\partial\left(1-\pi^2+2\gamma-3\alpha(2-\pi)\right)}{\partial\pi} & -\frac{\partial\left(1-\pi^2+2\gamma-3\alpha(2-\pi)\right)}{\partial\gamma} \end{vmatrix} = \frac{6-4\pi+12\alpha}{18-7\pi-6\pi^2+15\alpha+4\pi\alpha-6\alpha^2},$$

which is strictly positive for $0 < \alpha \leq \pi < 1$.

For the equilibrium policy level,

$$\frac{dy^*}{d\gamma} = \frac{\partial y^*}{\partial\pi^*}\frac{d\pi^*}{d\gamma} + \frac{\partial y^*}{\partial\alpha^*}\frac{d\alpha^*}{d\gamma} + \frac{\partial y^*}{\partial\gamma} = \frac{40-64\pi+29\pi^2-2\pi^3+56\alpha-50\pi\alpha+14\pi^2\alpha+37\alpha^2-14\pi\alpha^2+2\alpha^3+8\gamma\left(1-\pi-\alpha\right)}{\left(2-\pi+\alpha\right)^2\left(18-7\pi-6\pi^2+15\alpha+4\pi\alpha-6\alpha^2\right)},$$

which is strictly positive for $0 < \alpha \leq \gamma \leq \pi < 1$.

Finally, consider the lobbies' equilibrium contributions:

$$\frac{dC_P^*}{d\gamma} = \frac{\partial C_P^*}{\partial\pi^*}\frac{d\pi^*}{d\gamma} + \frac{\partial C_P^*}{\partial\alpha^*}\frac{d\alpha^*}{d\gamma} + \frac{\partial C_P^*}{\partial\gamma} = \frac{\left(1-\pi\right)\left(1+\alpha+\pi+\pi\alpha-\alpha^2-2\gamma\right)}{2\left(2-\pi+\alpha\right)^3\left(1+\alpha\right)^2\left(18-7\pi-6\pi^2+15\alpha+4\pi\alpha-6\alpha^2\right)} \cdot$$
$$(-58+65\pi+10\pi^2-31\pi^3+10\pi^4-163\alpha+125\pi\alpha+59\pi^2\alpha-51\pi^3\alpha+10\pi^4\alpha-147\alpha^2+$$
$$51\pi\alpha^2+84\pi^2\alpha^2-22\pi^3\alpha^2-15\alpha^3-39\pi\alpha^3+34\pi^2\alpha^3+28\alpha^4-26\pi\alpha^4+4\alpha^5+52\gamma-$$
$$70\pi\gamma+26\pi^2\gamma-4\pi^3\gamma+130\alpha\gamma-138\pi\alpha\gamma+24\pi^2\alpha\gamma+80\alpha^2\gamma-60\pi\alpha^2\gamma+8\alpha^3\gamma),$$

which is strictly negative for $0 < \alpha \leq \gamma \leq \pi < 1$, and

$$\frac{dC_A^*}{d\gamma} = \frac{\partial C_A^*}{\partial\pi^*}\frac{d\pi^*}{d\gamma} + \frac{\partial C_A^*}{\partial\alpha^*}\frac{d\alpha^*}{d\gamma} + \frac{\partial C_A^*}{\partial\gamma} = \frac{\alpha\left(1-2\alpha+\pi\alpha-\pi^2+2\gamma\right)}{2\left(2-\pi+\alpha\right)^3\left(2-\pi\right)^2\left(18-7\pi-6\pi^2+15\alpha+4\pi\alpha-6\alpha^2\right)} \cdot$$
$$(24-40\pi-2\pi^2+36\pi^3-22\pi^4+4\pi^5+138\alpha-209\pi\alpha+24\pi^2\alpha+75\pi^3\alpha-26\pi^4\alpha-$$
$$33\alpha^2+128\pi\alpha^2-120\pi^2\alpha^2+34\pi^3\alpha^2-28\alpha^3+55\pi\alpha^3-22\pi^2\alpha^3-20\alpha^4+10\pi\alpha^4+$$
$$48\gamma-80\pi\gamma+44\pi^2\gamma-8\pi^3\gamma+180\alpha\gamma-210\pi\alpha\gamma+60\pi^2\alpha\gamma+38\alpha^2\gamma-24\pi\alpha^2\gamma+4\alpha^3\gamma),$$

which is strictly positive for $0 < \alpha \leq \gamma \leq \pi < 1$. ■

E. Proof of Corollary 2

First, consider the case of a utilitarian government, where $\gamma = 0.5$. The system (C.2) yields the following closed-form solution for $\gamma = 0.5$:

$$\pi^* = \frac{9-\sqrt{17}}{8}, \qquad \alpha^* = \frac{-1+\sqrt{17}}{8}.$$

Then, for $\gamma = 0.5$,

$$y^* = \frac{2+\alpha^{*2}-\pi^{*2}}{2\left(2+\alpha^*-\pi^*\right)} = 0.5,$$

$$C_P^* = \frac{\left(1-\pi^*\right)^2\left(\alpha^*+\pi^*+\pi^*\alpha^*-\alpha^{*2}\right)^2}{4\left(1+\alpha^*\right)\left(2+\alpha^*-\pi^*\right)^2} = \frac{199-47\sqrt{17}}{512},$$

$$C_A^* = \frac{\alpha^2\left(2-2\alpha+\pi\alpha-\pi^2\right)^2}{4\left(2-\pi\right)\left(2+\alpha-\pi\right)^2} = \frac{199-47\sqrt{17}}{512}.$$

Therefore, $1-\pi^* = \alpha^*$, $C_P^* = C_A^*$ and $y^* = \gamma$ for $\gamma = 0.5$.

Second, consider the cases of anti-policy ($\gamma < 0.5$) and pro-policy ($\gamma > 0.5$) governments. Since $1-\pi^*$ is a decreasing function of γ and α^* is an increasing function of γ,

$$1-\pi^* > \frac{-1+\sqrt{17}}{8} \text{ and } \alpha^* < \frac{-1+\sqrt{17}}{8} \text{ for } \gamma < 0.5 \Rightarrow 1-\pi^* > \alpha^* \text{ for } \gamma < 0.5,$$

$$1-\pi^* < \frac{-1+\sqrt{17}}{8} \text{ and } \alpha^* > \frac{-1+\sqrt{17}}{8} \text{ for } \gamma > 0.5 \Rightarrow 1-\pi^* < \alpha^* \text{ for } \gamma > 0.5.$$

Next, consider the lobbies' equilibrium contributions. Since C_P^* decreases with γ and C_A^* increases with γ,

$$C_P^* > \frac{199-47\sqrt{17}}{512} \text{ and } C_A^* < \frac{199-47\sqrt{17}}{512} \text{ for } \gamma < 0.5 \Rightarrow C_P^* > C_A^* \text{ for } \gamma < 0.5,$$

$$C_P^* < \frac{199-47\sqrt{17}}{512} \text{ and } C_A^* > \frac{199-47\sqrt{17}}{512} \text{ for } \gamma > 0.5 \Rightarrow C_P^* < C_A^* \text{ for } \gamma > 0.5.$$

For the equilibrium policy level, note that

$$\frac{d\left(y^*-\gamma\right)}{d\gamma} = \frac{1}{\left(2-\pi+\alpha\right)^2\left(18-7\pi-6\pi^2+15\alpha+4\pi\alpha-6\alpha^2\right)} \cdot \left(-32+36\pi+7\pi^2-19\pi^3+6\pi^4-76\alpha+58\pi\alpha+25\pi^2\alpha-16\pi^3\alpha-17\alpha^2-17\pi\alpha^2+20\pi^2\alpha^2+11\alpha^3-16\pi\alpha^3+6\alpha^4+8\gamma\left(1-\pi-\alpha\right)\right)$$

is strictly negative for $0 < \alpha \leq \gamma \leq \pi < 1$. Therefore, $y^*-\gamma$ decreases with γ. Since $y^*-\gamma = 0$ for $\gamma = 0.5$,

$$y^*-\gamma > 0 \text{ for } \gamma < 0.5,$$

$$y^*-\gamma < 0 \text{ for } \gamma > 0.5. \blacksquare$$

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