Trust, Coordination, and The Industrial Organization of Political Activism

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January 2003 [3]

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[3]We are grateful for helpful comments to Gene Grossman, Jean Tirole, and three anonymous referees.

Abstract

We study political activism by several interest groups with private signals. When their ideological distance to the policy maker is small, a "low-trust" regime prevails: agents frequently lobby even when it is unwarranted, taking advantage of the confirmation provided by others' activism; conversely, the policy maker responds only to generalized pressure. When ideological distance is large, a "high-trust" regime prevails: lobbying behavior is disciplined by the potential contradiction from abstainers, and the policy maker's response threshold is correspondingly lower. Within some intermediate range, both equilibria coexist. We then study the optimal organization of influence activities, contrasting welfare levels when interest groups act independently and when they coordinate.

Keywords: lobbying, interest groups, activism, political economy, signaling games.

JEL Classification: D72, D78, D82.

I Introduction

Through strikes, demonstrations or costly lobbying, private agents and organized pressure groups commonly expend resources to try and influence the decisions of policy makers. While these phenomena are present in all societies, the level of political activism differs widely across countries. For instance, interest groups are generally much more organized, and spend much more on lobbying legislators, in the United States than in Europe. Even across more similar countries, and focussing on labor activism, the number of workdays lost to strike (per thousand workers) between 1960 and 1985 was only 37 in Germany and 76 in Sweden, but 428 in France and 1180 in Italy.[1] In the latter countries, people frequently complain that workers are "constantly" finding reasons to go on strike; unions retort that the government and employers only "understand" such strong displays of determination –perhaps even not really paying attention unless a general strike or similar action paralyzes the country. In other nations, by contrast, emerging labor conflicts are resolved through bargaining at a much earlier stage.[2]

Such variations in the intensity of political activism may reflect different fundamentals, or self-fulfilling vicious and virtuous cycles; we shall examine both in a unified framework. The common complaint about excessively strike-prone workers facing excessively unresponsive governments suggests a form of expectational trap. Several historical episodes of sudden, permanent changes in the levels of unionization, lobbying, and street protests that we discuss later on also suggest multiplicity and regimes shifts. Of course, fundamentals such as the costs of activism and the ideological distance between the policy maker and the interest groups surely matter as well. Another such factor that appears empirically important is what might be called the "industrial organization" of activists and interest groups; that is, the extent to which they act independently of each other, or on the contrary coordinate their actions through union confederations, lobbying coalitions, anti-globalization networks, and other forms of communication. For instance, countries where wage bargaining is carried out at a more centralized level generally have more flexible real wages and lower levels of unemployment; relatedly, countries with more centralized union movements experience fewer strikes (e.g., Western [1996]).

Recent work in political economy has significantly contributed to elucidating the roles played by interest groups and activists, showing how costly and apparently wasteful actions (participating in a strike, demonstrating with the risk of being arrested, hiring

[1] We are grateful to Bruce Western for providing us with the data on strikes that we used to compute these averages. See Western [1996] for a description of this data, compiled from OECD statistics.

[2] Relatedly, Blanchard and Philippon [2002] attribute the higher levels of labor conflict, and wage rigidity in the face of persistent unemployment experienced by some of the same countries, to a lower level of trust between their employers and their "old-style" (formerly communist-influenced) unions.

expensive lobbyists, etc.) may serve as signaling devices that allow citizens to convey useful information to decision makers. Most of this research has focused on two polar cases: that of a single lobbyist, and that of many small, anonymous activists. This leaves relatively unexplored a set of issues pertaining to strategic interactions between small numbers of large pressure groups (industries, unions, political parties, etc.), including the impact of alternative organizational structures. Yet, just as firms' ability to cooperate is a key variable in the functioning of markets, it is important to understand how activists' and interest groups' ability to share information and coordinate their actions may influence their behavior and the policy outcome.

For instance, the development of the labor movement in the United States has been marked by a recurrent tension between unity and division, and changes in the relationships among unions have generally been considered major events –starting with the merger between the American Federation of Labor (AFL) and the Congress of Industrial Organizations (CIO) in 1955, continuing with the exit of the Teamsters from the AFL-CIO in 1957 and that of the American Auto Workers in 1968, with the latter re-joining later on. In his classic work on political organizations, Wilson [1973] also points to the rivalry between the three major Jewish organizations in the United States to illustrate how the relationship between interest groups with overlapping "jurisdictions" and support bases is characterized by a fundamental tension between the need for coordination and the ambition of independence.

To study these issues, we develop in this paper a simple model of interaction among n interest groups (unions, industry lobbyists) who observe imperfect signals on the state of the world, and try to convince a policy maker that she should reallocate resources in a way that favors their constituency (unemployment benefits, weapons procurement). We derive and contrast the equilibria of the signaling game when activists act independently and when they coordinate, and characterize the welfare implications of these two organizational structures. The analysis brings to light two strategic effects that shape the informativeness and welfare properties of the outcome: a *"disciplinary"* effect and a *"confirmation"* effect, as described below. When the first one dominates, the presence of other independent activists –even with perfectly congruent interests– limits each informed agent's ability to bias the policy choice, and allows the decision maker to extract information more effectively. In this case trust is higher, lobbying costs lower, and social welfare consequently greater, as a result of the independence of the interest groups. When the second effect dominates, however, the equilibrium is characterized by low trust and a low responsiveness on the part of the policy maker, as well as by higher lobbying costs. The decision maker does not pay attention unless a larger number of agents actively lobby, and conversely each of them exploits the "confirmation" provided by the presence of the

others to engage in more unwarranted lobbying.

The idea behind these results is intuitive. Because interest groups' actions are based on private signals that are all imperfectly correlated with the underlying policy-relevant state, the expected return to each one's lobbying depends on how many others also "show up" to help convince the policy maker. In determining an agent's incentive to lobby, it is therefore essential to determine in which event he can induce a policy change, and the likelihood of that "pivotal event". For instance, the decision maker may respond even when only a few of agents actively lobby, require a larger quorum, or even be swayed only by a unanimous front (e.g., a general strike). The important point is not just that each lobbyist considers when he will be pivotal, and conditions his behavior on this event, as in the voting models of Austen-Smith and Banks [1996] or Feddersen and Pesendorfer [1997]. The novelty in the problem we consider is that the pivotal event is *itself endogenous:* it is defined by the *action threshold* of the policy maker, which may be high or low depending on her level of *trust* in agents' reports, and is therefore jointly determined with their equilibrium strategies.[3] To see intuitively how this gives rise the two key effects mentioned earlier, and possibly to the emergence of different regimes, consider here the case of $n = 2$ interest groups.

• *The "confirmation" effect.* When it takes lobbying by both groups to sway the decision maker, the pivotal event is such that the second lobbyist is providing confirmatory evidence for the first one's claim. Thus, even when each has a high propensity to lie they can still, together, convince the policy-maker. Note that this positive spillover on the first activist occurs only when the second one also turns out to lobby; but with a distrustful policy maker who responds only to generalized pressure, it is only in that event that the action of the first activist matters anyway. In equilibrium, there is thus more unwarranted lobbying than with a single agent, and the planner is less responsive to it.

• The "*discipline" effect.* When lobbying by a single agent suffices to convince the policy-maker, on the other hand, the presence of a second activist generates, in the pivotal event, a negative informational spillover: by his abstention, the second agent implicitly contradicts the first one's claim. To counteract this adverse evidence and convince the decision maker on his own, each lobbyist must be more credible, meaning that he can afford to lie less often (with a lower probability). In equilibrium, the presence of a second interest group thus disciplines the first one's behavior, resulting in less unwarranted lobbying and allowing the planner to be more responsive.

[3] In voting models, by contrast, the consequences of an agent's behavior are mechanic: with majority rule, for instance, the pivotal event for an individual is when $(n-1)/2$ others express in favor of his preferred option. While the informational content of that event depends on agents' voting strategies, the event itself is fixed, and so are its policy consequences.

When will each effect prevail? We show that when the expected degree of policy disagreement between the lobbyists and the policy maker is relatively small (e.g., they come from the same side of the political spectrum), the unique symmetric equilibrium with activism is of the *"low-trust"* type; when expected conflict is relatively important (they represent divergent interests), it is of the *high-trust"* type; for an intermediate range of values, *both equilibria* may coexist. We also examine the welfare implications of the different equilibria, comparing them in particular to the no-activism case and the coordination benchmark. Lobbying in the low-trust regime is always socially harmful, even more so than in the coordinated game, where it is found to always reduce welfare. In the high-trust regime, by contrast, political activism is beneficial, generating information whose social value exceeds the costs dissipated on signaling. Similarly, with an arbitrary number of interest groups we identify conditions under which there will be a "minimum-trust" equilibrium (the decision maker requires unanimity in lobbying) or a "maximum-trust" equilibrium (a simple majority will suffice), with any other one necessarily lying between these two extremes (qualified majority).

This analysis of strategic interactions among lobbyists then allows us to study the optimal organization of influence activities, asking whether the policy maker and the activists would prefer that the latter coordinate their actions, or act separately. We show that when the ex ante likelihood of policy disagreement between them is relatively small, both sides agree that an organizational structure in which informed agents can cooperate is superior. When anticipated conflict is high, on the contrary, a configuration with independent lobbies is unanimously preferred. In intermediate cases the policy maker and the interest groups may have conflicting preferences over the organizational structure.

A Related literature

Signalling models of political action can be divided into two broad classes: those where information transmission is costly, and those of "cheap talk" (see Grossman and Helpman [2001] for a comprehensive treatment of the literature on interest group politics). Our paper is more closely related to the first line of research, but also develops some of the issues discussed in the second.

Potters and van Winden [1992] and Austen-Smith [1995] were among the first papers to explain how the expensive lobbying observed empirically can be understood as a form of costly informational transmission. They focussed on political action by a single informed agent, and therefore did not investigate strategic interactions among multiple activists. Lohmann [1993a, 1994] showed that, despite the free-rider problem first pointed out by Olson [1965] in his classic work, effective signaling may take place even with many agents

who are each informationally insignificant with respect to the aggregate. These papers derived and analyzed the necessary conditions characterizing an informative equilibrium with many activists, but did not study the existence or multiplicity of equilibria. They also did not compare the welfare properties of equilibria generated by different organizational structures or self-fulfilling beliefs.[4] Austen-Smith and Wright [1994] studied a model where two lobbyists seek to influence a policy maker, but their main concern was the ex-ante decision to acquire information, rather than the organization of lobbyists (their ability to cooperate or be independent) or the coordination of expectations ("trust", or lack thereof).[5] More closely related is Chapter 5 in Grossman and Helpman [2001], who pointed out the potential for multiple equilibria in a simple example with two like-minded lobbyists. They then dismissed this phenomenon, however, because in their framework with perfect signals the "low trust" equilibrium can be supported only through very implausible out-of equilibrium beliefs.[6]

The impact of the organization of multiple interest groups has been studied in more detail in the literature on cheap talk initiated by Crawford and Sobel [1982]. In an important series of papers, Austen-Smith [1990, 1993a, 1993b] examined how different organizational structures affect the transmission of information through cheap talk, comparing in particular the properties of the equilibrium when informed agents report simultaneously or sequentially. More recently, Krishna and Morgan [2000, 2001] analyzed communication between two senders and a receiver with a one-dimensional policy space, and Battaglini [2002a, 2002b] the case of multiple senders with noisy signals and a multidimensional policy space.[7] None of these papers, however, directly addressed the questions of how coordination problems impact welfare, or the preferences of the policy maker and informed agents over the organizational structure.

The paper is organized as follows. In Section II we present the model, then briefly review the benchmark case of a single interest group. In Section III we turn to the case of

[4]Lohman [1993b] analyzed the sources of welfare loss involved in a decentralized political equilibrium, relative to the first-best case of a social planner who could directly control agents' lobbying probabilities.

[5]Their model is also different in that the lobbyists communicate costlessly with the policy maker, who can then, at a cost, verify their veracity. Another important paper with multiple lobbyists is Austen-Smith [1998], which focuses on the policy maker's tradeoff between granting access for informational reasons or for monetary contributions.

[6]Palfrey and Rosenthal's [1983, 1985] model of costly voting also features a multiplicity of equilibrium turnout levels, but it is not robust to the introduction of uncertainty over the number of voters. Because there are no private signals from voters to be aggregated, moreover, all equilibria lead to the same policy outcome. In our model, the multiple regimes are robust to uncertainty over the number of lobbyists (always present since private signals are imperfect), and differ in their informational and allocative consequences.

[7]Multidimensionality is what yields full revelation in Battaglini's model, whereas in the present one it never occurs. The two are not directly comparable, however, because his is one of cheap talk rather than costly signaling.

several activists who act strategically, and derive our main results on endogenous informational externalities, multiplicity, and social welfare. In Section IV we study the "industrial organization" of activism, by comparing the informativeness and welfare properties of the equilibria that prevail when activists can coordinate and when they cannot. Section V extends the main analysis to an arbitrary number of interest groups, and Section VI concludes. Proofs are gathered in the appendix.

II The model

A Preferences and signals

A policy maker needs to make a decision based upon the state of the world, $\theta \in \{H, L\}$. As indicated on Figure 1.a, when the state is low (L) the status quo or default option d is optimal, yielding a payoff of a_L as compared to 0 for some "active" policy a. In the high state (H), conversely, a is preferable to d, as these choices result in social payoffs of a_H and 0 respectively. Conditional on her information $\mathcal{I}_0$, the policy maker has a prior belief $\rho \equiv \Pr(H \,|\mathcal{I}_0)$. We assume that ρ is low enough that, if no evidence in favor of an active policy is received, she will maintain the status quo:

$$\rho < \frac{a_L}{a_L + a_H} \equiv \overline{\rho}. \tag{1}$$

Additional information on the state of the world is available to $n \geq 1$ agents who may try to influence the policy decision through some form of activism such as lobbying, strikes, public demonstrations, etc. These agents all share the same preferences, which differ from those of the policy maker: the later is concerned not just about the activists' utility, but about *social welfare* more generally. Figure 1.a depicts this conflict of interests: in state H both the policy maker and the informed agents would agree on taking the action a; in state L, however, the former prefers the status quo, but the latter would still like the active policy, since $b_L > 0$. We assume that action a is relatively more beneficial in the high state for the activists, as it is for the policy maker: $b_H > b_L$.[8]

If there was only one (risk-neutral) informed agent, one would not need to consider the possibility of his being mistaken, since the signal he received would be the only relevant state of the world: no action could be contingent on anything else. To study strategic interactions between several activists, however, it is important that their signals be imperfectly correlated, hence noisy. This information structure is described in Figure 1.b: in any state $\theta \in \{H, L\}$, each activist receives a "correct" signal with probability

[8] This payoff matrix was introduced by Potters and van Winden [1992], who studied the single-lobbyist case under the assumption that his signal is perfectly informative.

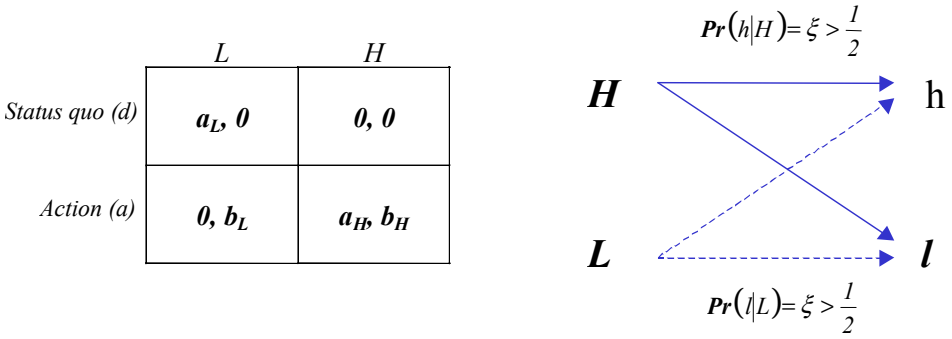

Figure 1: payoffs and private signals. The left panel gives the decision maker's and activists payoffs (in that order), for each state-policy combination $(\theta, \alpha) \in \{L, H\} \times \{d, a\}$. The right panel gives the activists' distribution of signals in each state θ.

$\xi \geq 1/2$, and a "wrong" signal with probability $1 - \xi$. We assume that the precision ξ is sufficiently high that, if the policy maker were to observe the favorable signal $s = h$ herself, her posterior would increase enough to cause her to switch to the action a :

$$\Pr(H \,|s = h; \rho) > \overline{\rho}. \tag{2}$$

Since $\Pr(H \,|s = h; \rho)$ increases with ρ, this corresponds to assuming that $\rho > \underline{\rho}$, where $\underline{\rho}$ solves (2) as an equality.

Following an established literature, we assume that activism is costly: if an agent wants to advocate his cause, he must spend c. We shall assume that $c < b_L$, so that even in the low state of the world it would be worth incurring c, if it convinced the policy maker to switch from the status quo to the desired action a. This corresponds to the most realistic and interesting case. First, it rules out the rather obvious cases of an equilibrium in which types perfectly separate ($b_L < c < b_H$), or where activism is prohibitively costly ($b_H < c$). Second, it is empirically more plausible to assume that the costs of activism are far less than the potential benefits of influence.[9]

Finally, the case where c is relatively small also allows us to focus attention on the key issue of potential misrepresentation by agents seeking to influence public policy. Indeed,

[9]For instance, Lohmann [1995, p.278] reports that in 1985 insurance companies contributed a total of \$129,326 to the chairman of the Finance Committee of the U.S. Congress; by comparison, "for these companies, tax-exempt status of fringe benefits ... is worth millions". De Figueiredo [2002, p.1] reports that contributions to congressional candidates from PACs' averaged about \$123 million annually during the 1999-2000 election cycle, while corporations, unions and other interest groups gave about \$76 million annually in "soft money" during the 1997-1998 cycle. The average is thus about \$200 million per year, "yet Congress controls a \$2 trillion budget, about 40% of which is discretionary spending". Among the reasons that might explain these facts are legal limitations on special-interest contributions, and more generally the public concern over the corruption of officials that underlies such regulations.

we show (see Lemma 2 in the appendix) that for all c below some threshold $c^* > 0$, there can be no equilibrium with activism in which the policy maker is as responsive as if the informed agents never lied. We shall assume that $c < c^*$ throughout the paper.

Let us now describe players' strategies. A behavioral strategy for an activist is a pair of lobbying probabilities $\tilde{x} \equiv (x(l), x(h)) \in [0,1]^2$, one for each possible signal that he might receive; we shall also refer to $s \in \{l, h\}$ as the agent's (low or high) type. As explained below, in the equilibria of interest agents will always lobby after receiving a favorable signal ($x(h) = 1$), so their strategy space will in fact be unidimensional.

Turning now to the planner, the only event she observes is the number of lobbyists who are active. Her strategy is thus a mapping associating to each $i \in \{0, 1, ..., n\}$ a probability y_i of taking the action a. The posterior beliefs on which she bases her decision,

$$\mu_{n,i}(\tilde{x}, \rho) \equiv \Pr[\theta = H \mid i; \tilde{x}, \rho], \tag{3}$$

are given by standard Bayesian updating.

Lobbyists seek to maximize their expected payoff, represented in Figure 1.a, given the strategy of the decision maker. By definition, the latter's payoffs reflect *all* the social welfare implications of the policy choice (a versus d), and thus already incorporate its value to the lobbyists. We also assume that resources spent for pure signaling purposes have little or no social value. This is most obvious for those forms of activism, such as strikes, mass layoffs or riots, that directly hurt other agents. All that really matters, however, is that signaling costs not represent pure transfers, but involve some deadweight loss. The net payoff of the policy maker (net social welfare) when i agents lobby and she chooses action $y \in \{0, 1\}$ is therefore:

$$W(y; i, \theta) \equiv y a_H \cdot \mathbf{1}_{\{\theta=H\}} + (1-y) a_L \cdot \mathbf{1}_{\{\theta=L\}} - \lambda i c, \tag{4}$$

where a_θ is the social payoff to taking action a in state θ (given by Figure 1.a), $\mathbf{1}_{\{.\}}$ the indicator function, and λ the shadow cost of burning money.[10] The planner thus seeks to maximize $E_\theta[W(y; i, \theta) \mid i; \tilde{x}, \rho]$.

In this model there is always an uninformative equilibrium: agents abstain from lobbying because the policy maker pays no attention to their actions, always choosing the status quo; conversely, she interprets lobbying (off the equilibrium path) as relatively likely to have come from a low type. This equilibrium is neither economically interesting

[10] By definition, this social payoff is the sum of the net payoffs to lobbyists (as a group), $y\left[b_H \cdot \mathbf{1}_{\{\theta=H\}} + b_L \cdot \mathbf{1}_{\{\theta=L\}}\right] - ic$, and to the rest of society, $y(a_H - b_H) \cdot \mathbf{1}_{\{\theta=H\}} + [(1-y)a_L - y b_L] \cdot \mathbf{1}_{\{\theta=L\}} + (1-\lambda)ic$, where a_θ and b_θ, $\theta \in \{H, L\}$, are given by Figure 1.a. Note that this setup allows for political activities to have strictly negative externalities on the rest of society (e.g., strikes, riots): this simply corresponds to the case where $\lambda > 1$.

nor very plausible empirically.[11] To eliminate it and other uninteresting cases, we shall restrict attention to *equilibria with activism,* defined as those where both types of agents lobby with positive probability, and at least the high type does so with probability greater than some arbitrarily small but fixed $\varepsilon > 0$.[12] We shall also assume that the relative profitability of influencing policy in the two states, b_H/b_L, is greater than some given lower bound, $\beta^* > 1$. This will ensure that equilibria with activism always exist, and that, in any such equilibrium, one must actually have $x(h) = 1$ (see Lemma 1 in the appendix); accordingly, a lobbying strategy will from now on just be described by $x \equiv x(l)$. The above conditions thus allow us to focus on the real issue of interest, namely activists' incentives to strategically misrepresent their information, and the decision maker's limited ability to sort valid claims from false ones.[13] Finally, to avoid technicalities we shall focus on symmetric equilibria.[14]

B The single-interest-group benchmark

We first briefly consider the case of a single informed lobbyist, as it is a natural benchmark with which to compare situations where multiple interest groups interact strategically. We shall also see that it is equivalent to the outcome that obtains when many lobbyists are able to coordinate their actions, even in a relatively weak (incentive compatible) sense.

The single-lobbyist case has been studied in the literature under the assumption that he observes a perfectly informative signal ($\xi = 1$).[15] In the absence of strategic interactions this is essentially a normalization, so although we allow the signal to be noisy, the basic

[11] It cannot even be interpreted as corresponding to a low level of activism, because it is essential that the realized probability of lobbying be exactly zero: even a small probability would destroy this equilibrium. This would occur, for instance, if one added noise by assuming that there are (perhaps with an infinitesimal probability) "honest" citizens who would always lobby for a "just cause".

[12] That is, $x(h) \geq \varepsilon > 0$ and $x(l) > 0$. Clearly, for any signaling to occur one must have $x(h) > x(l)$ (otherwise lobbying would always be counterproductive, hence unprofitable). Thus, if any equilibria with $x(h) < \varepsilon$ exist, they involve only a negligible probability of information transmission.

[13] With a single agent, the activism refinement just rules out the uninformative equilibrium. With multiple agents it also combines with the assumption on b_H/b_L (superfluous when $n = 1$) to rule out two other uninteresting cases. The first is where agents never lie ($x(l) = 0$) but those with a high signal do not necessarily report it ($x(h) < 1$), because they are unsure of whether others will back them up. This is a kind of "attenuated" version of the uninformative equilibrium. The second case is where both types lobby with probabilities $0 < x(l) < x(h) < 1$, but $x(l)/x(h)$ has the same value as in the high-trust equilibrium we analyze, where $x^*(h) = 1$. This invariance of relative activism (required to maintain the same posterior belief for the decision maker) makes the two equilibria very similar in terms of the key screening problem. In terms of total lobbying expenditures, they would differ by a scaling factor.

[14] Among asymmetric equilibria, there can be some where a subset of agents are never informative, while the others play the same equilibrium with lobbying as the one we study. There may also be asymmetric equilibria where all agents lobby with positive but unequal probabilities. None of these cases yields any significant additional insight, however.

[15] See Potters and van Winden [1991] and Grossman and Helpman [2001].

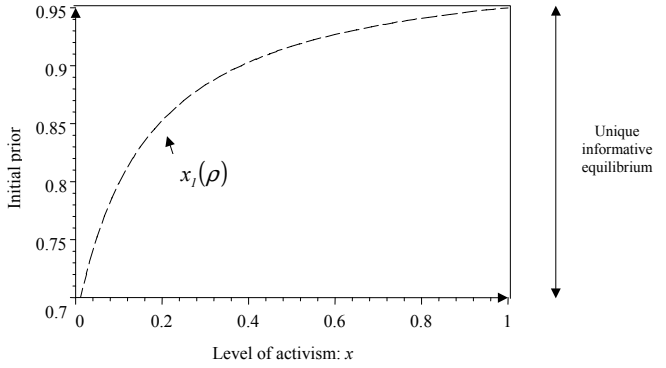

Figure 2: equilibrium level of activism following a low signal ($s = l$), in the single-agent case.

intuitions for the case $n = 1$ remain essentially unchanged. Let us first focus on the activists' strategy. Observe that $x = 0$ can never be an equilibrium, or else lobbying would raise the decision maker's posterior to $\mu_{1,1}(x, \rho) = 1$, and would therefore always be profitable –a contradiction. It also cannot be that an informed agent lobbies regardless of his signal: with $x = 1$, the policy maker's posterior belief would never change; so lobbying could not be optimal. More generally, after having observed lobbying (event $\mathcal{I}_{1,1}$) the decision maker's posterior must be such that:

$$\mu_{1,1}(x, \rho) = \frac{\rho[\xi + (1-\xi)x]}{\rho[\xi + (1-\xi)x] + (1-\rho)[1-\xi+\xi x]} \geq \overline{\rho}. \tag{5}$$

Since $\mu_{1,1}(x, \rho)$ is increasing in ρ and decreasing in x, this determines an upper bound $x_1(\rho)$ on the equilibrium lobbying strategy x, with $x_1(\rho)$ increasing in the prior ρ and strictly between 0 and 1 for all $\rho \in \left(\underline{\rho}, \overline{\rho}\right)$; see Figure 2. We shall refer to this locus as the *informativeness constraint,* because it imposes a limit on the lobbyist's ability to lie (being active after having observed a low signal): one must have $0 < x \leq x_1(\rho) < 1$.

We now turn to the policy maker's reaction, y_1. In order for an agent who received a low signal ($s = l$) to choose an interior level of x, he must be indifferent between lobbying and remaining passive. This means that:

$$y_1 \cdot [\xi b_L + (1-\xi) b_H] = c. \tag{6}$$

We shall refer to this as the *incentive constraint,* because it requires the policy maker's behavior to make the agent's decision to lobby (when $s = l$) just break even, in expectation. Since $c < b_L$ it is clear that $y_1 \in (0, 1)$, so the decision-maker must also be indifferent after observing lobbying activity; consequently, the informativeness constraint $\mu_{1,1}(x, \rho) \geq \overline{\rho}$ must hold with equality.

In summary, the *unique* equilibrium with activism is characterized by $x_1^* = x_1(\rho)$ and $y_1^* = c[\xi b_L + (1-\xi)b_H]^{-1}$. Perhaps surprisingly, the fact that there is lobbying in equilibrium and that it truly conveys information ($x_1 < 1$) does not imply that the policy maker is better off. In our model she is in fact strictly *worse off.* Indeed, when the lobbyist is active the decision maker's posterior is just equal to $\bar{\rho}$, so she is indifferent between the two policy options. Thus, ex-ante welfare, gross of signaling costs, is the same as when she always chooses the status quo. The occurrence of lobbying implies, however, a social welfare loss associated with the money burned, or the costs inflicted on other parties, in the signaling process. This social loss is proportional to the shadow cost of lobbying expenditures, $\lambda > 0$.

While this result is of interest (and seems to have been previously overlooked), it is also somewhat specific to the model at hand.[16] Our main point, however, is not about whether lobbying raises or lowers the absolute level of social welfare, whether in the single agent case or more generally. We are interested instead in *comparing* the effects of activism under different organizational structures, and in showing how these provide different incentives for information transmission.

III Interactions between interest groups

We now turn to the main case of interest, namely that of multiple lobbies or activists. In this section we consider the (most natural) situation where they act without coordination. The case where they do coordinate their actions is examined in the next section, where we show that it is equivalent to the single-agent benchmark. We then compare the informativeness and welfare properties of political activism in the two cases.

A The discipline and confirmation effects

For simplicity, we focus here the analysis on the case of $n = 3$ lobbyists. The case $n > 3$ is considered in Section V, and leads to very similar insights.[17] As with a single agent, we

[16] For instance, when lobbying costs are high enough that perfect sorting occurs, there is typically a welfare gain; we previously argued, however, that this parameter configuration is empirically implausible. More importantly, in a model where the level of lobbying is a continuous variable (and the equilibrium is in pure strategies, e.g., Grossman and Helpman [2001], Chapter 5), the informational gain can dominate the resources dissipated on lobbying.

[17] Due to the symmetry of the model, the case $n = 2$ is somewhat degenerate, yielding only a subset of the equilibria of interest. Indeed, lobbyists have the same reliability of information ξ and use the same strategy, which is never entirely truthful ($x > 0$). Therefore, when one is active and the other not, the decision maker's posterior $\mu_{1,2}$ is below her prior. Consequently, with $n = 2$ there can be no analogue to the "high-trust" equilibrium that can arise with any $n \geq 3$.

first derive the informativeness and incentive constraints, then characterize the equilibria (with activism) resulting from their interaction.

1. The informativeness constraints. The number of agents who actively lobby can now be any $i \in \{0,1,2,3\}$. It will be essential to determine in which of these events, denoted $\mathcal{I}_{3,i}$, a given agent can expect his action to be "pivotal", prompting the policy maker to take the desired action a with positive probability. When $i = 1$, the positive information conveyed by a single active lobbyist is not enough to compensate the negative signals represented by the inactivity of the other two.[18] The pivotal events can thus only be $\mathcal{I}_{3,2}$ or $\mathcal{I}_{3,3}$, meaning that respectively two or three lobbyists are simultaneously active. Corresponding to these two events are two *informativeness constraints*, defined by the solutions $x_{3,2}(\rho)$ and $x_{3,3}(\rho)$ to:

$$\mu_{3,2}\left(x_{3,2}(\rho),\rho\right) = \overline{\rho}, \tag{7}$$

$$\mu_{3,3}\left(x_{3,3}(\rho),\rho\right) = \overline{\rho}, \tag{8}$$

for any $\rho \in (\underline{\rho},\overline{\rho})$. Recall that $\mu_{3,i}(x,\rho)$ is the decision maker's posterior after event $\mathcal{I}_{3,i}$, so the locus $x_{3,i}(\rho)$ determines the strategy x that makes her exactly indifferent between a and d in that event. Figure 3 plots these loci as functions of ρ, together with the benchmark $x_1(\rho)$ corresponding to the single-agent case.

The locus $x_{3,3}(\rho)$ lies uniformly to the right of $x_1(\rho)$, because of the *positive informational spillover* provided by the fact that two additional lobbyists are active in the event $\mathcal{I}_{3,3}$, compared to $\mathcal{I}_{1,1}$. As a result, the posterior $\bar{\rho}$ required to convince the policy maker can be achieved even when everyone lies with a higher probability. Conversely, because the decision maker expects the agents to lie more, she requires more of them to incur the cost c in order for her to be persuaded. The decision maker's *mistrust* of the agents, and their actual untrustworthiness, are mutual best responses.

The locus $x_{3,2}(\rho)$, by contrast, lies uniformly to the left of $x_1(\rho)$, because a *negative informational spillover* is now at work. In the event $\mathcal{I}_{3,2}$ the abstention of one agent constitutes for the decision maker a negative signal about the state of the world, and it is *less than fully* compensated by the activism of one other.[19] In order to achieve the required posterior of $\bar{\rho}$, the strategy used by each agent must therefore be more credible, i.e. involve a lower x. Conversely, it is the decision maker's greater *trust* in activists' veracity that makes her willing to respond even when only two of them are lobbying,

[18] Since all lobbyists have the same precision ξ and use the same (symmetric) equilibrium strategy x, two low signals (abstaining lobbyists) are always stronger than a single high one (active lobbyist).

[19] Both might have received misleading signals (in opposite directions) with the same probability ξ, but the latter might also be lying, i.e., lobbying even though he received $s = l$.

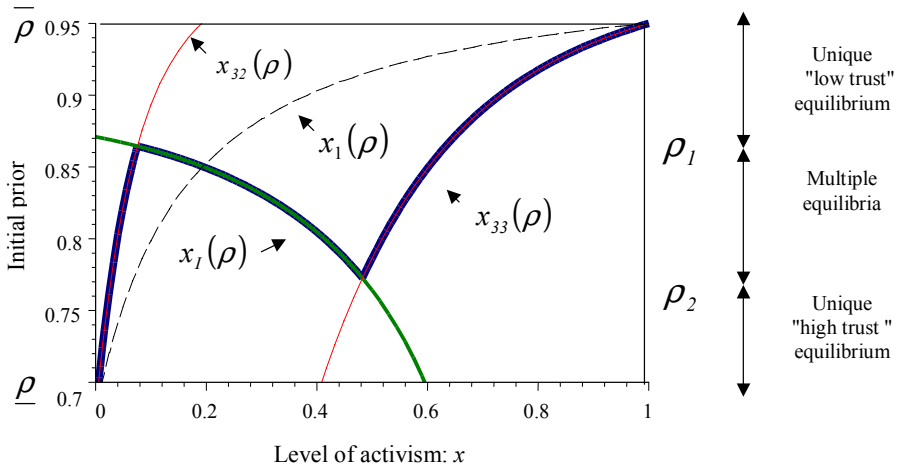

Figure 3: informativeness constraints, incentive constraint, and equilibria in the 3-agent case.

thereby making $\mathcal{I}_{3,2}$ the pivotal event. To summarize, we have:

$$x_{3,2}(\rho) \leq x_1(\rho) \leq x_{3,3}(\rho). \tag{9}$$

The informativeness constraints will now allow us to characterize the equilibrium set. First, the equilibrium level of x can never above $x_{3,3}(\rho)$, otherwise we would have $\mu_{3,3}(x,\rho) < \overline{\rho}$; the policy maker would then always choose the status quo, and lobbying would not be optimal. Second, in equilibrium x can also not be below $x_{3,2}(\rho)$, or else we would have $\mu_{3,2}(x,\rho) > \overline{\rho}$; the policy maker would then choose a with probability 1 even when only two agents lobbied (and still with probability zero when one or less lobbied), thus behaving exactly as if she believed the activists to always be truthful. But we show in the appendix (Lemma 2) that for $c < c^*$, no such equilibrium can exist: intuitively, with such an "accommodating" policy maker and relatively low costs of activism, each agent's incentive to lobby would be too strong, causing him to deviate to $x = 1$. In summary, one must have

$$x_{3,2}(\rho) \leq x^*(\rho) \leq x_{3,3}(\rho) \tag{10}$$

for all ρ, leaving only three cases to consider.

First, it may be that $x^*(\rho) = x_{3,2}(\rho)$, meaning that $\mu_{3,2}(x^*,\rho) = \overline{\rho} < \mu_{3,3}(x^*,\rho)$. The pivotal event is then $\mathcal{I}_{3,2}$, to which the policy maker responds by randomizing between d and a (thus $0 < y_2 < y_3 = 1$): even if one lobbyist is not active, lobbying by the other two is potentially effective and triggers, with some probability, a policy change. Since $x_{3,2}(\rho) < x_1(\rho)$, we see that the presence of the other informed agents exerts in this case a

disciplinary effect, helping to screen the pressure groups. We shall refer to this outcome as the *high-trust* equilibrium.

Conversely, one may have $x^*(\rho) = x_{3,3}(\rho)$, meaning that $\mu_{3,3}(x, \rho) = \overline{\rho} > \mu_{3,2}(x, \rho)$. The pivotal event is then $\mathcal{I}_{3,3}$, and it takes all three lobbyists' efforts to bring the decision maker to the point of indifference between her two policy options (thus $0 = y_2 < y_3 < 1$). In this situation each activist knows that he will be pivotal only if all the others also turn out to lobby in favor of the desired policy. By implicitly corroborating his own lobbying in the pivotal event, they allow him to engage in more misrepresentation: $x_{3,3}(\rho) > x_1(\rho)$. We refer to this as the *confirmation effect,* and to the corresponding outcome as the *low-trust* equilibrium.

Finally, it may be that $x_{3,2}(\rho) < x^*(\rho) < x_{3,3}(\rho)$, meaning that $\mu_{3,2}(x^*, \rho) < \overline{\rho} < \mu_{3,3}(x^*, \rho)$. The pivotal event is again $\mathcal{I}_{3,3}$, requiring all three agents to bring about a policy change. The difference with the previous case is that, following this event, the decision maker now strictly prefers the active policy a ($y_2 = 0,\ y_3 = 1$). This type of equilibrium can be seen as a "mixture" of the other two, and indeed we shall see that it only arises when the high and low-trust equilibria coexist.

2. The incentive constraint. Since the policy maker always chooses the status quo when $i < 2$ lobbyists are active, we only need to characterize the strategies y_2 and y_3 that describe her reaction when $i = 2$ or $i = 3$. These must be such that an agent with $s = l$ is willing to play some $x^* \in (0,\ x_{3,3}]$, and is therefore indifferent between activism and abstention. Denoting by $u_l(y_2, y_3; x, \rho)$ the *net* expected utility of choosing to lobby for an agent with such a signal, we must therefore have:

$$\begin{aligned} u_l(y_2, y_3; x, \rho) \equiv & \sum_{\theta=H,L} \Pr(\theta \,|s = l)\, b_\theta \left[y_2 \pi_1(x, \rho\,|\theta) + y_3 \pi_2(x, \rho\,|\theta)\right] \\ & - \sum_{\theta=H,L} \Pr(\theta \,|s = l)\, b_\theta \left[y_2 \pi_2(x, \rho\,|\theta)\right] = c, \end{aligned} \tag{11}$$

where $\pi_j(x, \rho\,|\theta), j = 1, 2$, denotes the probability that j *other* lobbyists are active in state θ. The first sum is the gross expected benefit of lobbying, while the second represents a *free-rider* effect, which reduces the net incentive to activism: when $y_2 > 0$ the agent knows that even if he abstains, the desired policy may still be chosen if both of the others turn out to lobby.

Condition (11) is the equivalent of (6) in the single-agent case. The main difference is that it now involves not only the decision maker's strategy (y_2, y_3), but also that of the other informed agents, x, which determines the probability distribution of the events $\mathcal{I}_{3,i},\ i \in \{1, 2, 3\}$. This last dependence is really the crucial one, because (11) can in fact be reexpressed in terms of a simple locus that is independent of the policy maker's behavior.

We shall define this *incentive constraint* $x_I(\rho)$ as the unique solution to the equation:

$$u_l(0,1;x_I(\rho),\rho) = c, \tag{12}$$

for all $\rho \in [\underline{\rho}, \overline{\rho}]$.[20] As shown on Figure 3, $x_I(\rho)$ describes a decreasing locus in the (x,ρ) space, intersecting the two informativeness constraints at points ρ_1 and ρ_2 respectively. Along this locus the agent is indifferent between lobbying and remaining silent, *if* he expects the policy a to be chosen with probability 1 when all three agents turn out to lobby, and with probability zero otherwise. Conversely, since $x_{3,2}(\rho) < x_I(\rho) < x_{3,3}(\rho)$ the decision maker's posterior is strictly above $\bar{\rho}$ following the event $\mathcal{I}_{3,3}$, and strictly below following $\mathcal{I}_{3,2}$; thus the pure strategy $(y_2, y_3) = (0,1)$ is indeed optimal for her.

3. The equilibria. The set of equilibria with activism is illustrated by the bold lines on Figure 3. It is fully characterized by the following proposition, which also shows that the different levels of informativeness and lobbying associated to each equilibrium have very distinct welfare implications.

Proposition 1 *The symmetric equilibria of the lobbying game are characterized by two thresholds ρ_1 and ρ_2, with $\underline{\rho} \leq \rho_1 < \rho_2 \leq \overline{\rho}$, such that:*

1. *For $\rho > \rho_2$ there is a unique "low-trust" equilibrium, in which $x^*(\rho) = x_{3,3}(\rho) > x_1^*(\rho)$. Because each interest group is very unreliable, the decision maker only pays attention when all of them actively lobby: $0 = y_2^* < y_3^* < 1$. In this equilibrium, social welfare is lower than with a single lobbyist, and a fortiori lower than when there is no lobbying.*

2. *For $\rho < \rho_1$ there is a unique "high-trust" equilibrium, in which $x^* = x_{3,2}(\rho) < x_1^*(\rho)$. Each interest group's behavior is then sufficiently reliable for the decision maker to react even when just two of them actively lobby: $0 < y_2^* < y_3^* = 1$. In this equilibrium, social welfare is higher than when there is no lobbying, and a fortiori higher than with a single-lobbyist, provided λc is no too large.*

3. *For $\rho \in [\rho_1, \rho_2]$, both equilibria coexist. Moreover, there is a third equilibrium in which $x^*(\rho) = x_I(\rho) \in (x_{3,2}(\rho), x_{3,3}(\rho))$. The policy maker's optimal decision rule is then $y_2^* = 0$, $y_3^* = 1$.*[21]

[20] In any equilibrium, either $y_2 = 0$ or $y_3 = 1$. Since $u_l(y_2, y_3; x, \rho)$ is increasing in y_2, y_3 and x, there exists a $y_3 \in (0,1)$ such that $u_l(0, y_3; x, \rho) = c$ if and only if $u_l(0,1;x,\rho) > c$, meaning that $x > x_I(\rho)$. Similarly, there exists a $y_2 \in (0,1)$ such that $u_l(y_2, 1; x, \rho) = c$ if and only if $u_l(0,1;x,\rho) < c$, meaning that $x < x_I(\rho)$. See the proof of Proposition 1 in the appendix.

[21] The level of welfare of this "intermediate" equilibrium varies continuously with ρ : when $\rho \approx \rho_2$, so that $x_I(\rho) \approx x_{3,2}(\rho)$, the equilibrium is more efficient that the no-lobbying or single-lobbyist benchmarks. Conversely, it is less efficient when $\rho \approx \rho_1$, since $x_I(\rho) \approx x_{3,3}(\rho)$; see Figure 3. More generally, the $x_I(\rho)$ equilibrium represents a kind of mixture of the other two, so we shall devote less attention to it.

Several interesting lessons emerge from this proposition. A first one is the self-confirming interplay of trust or distrust on the policy maker's side with the trustworthiness or untrustworthiness of lobbyists' behavior. A second one, closely related, is the potential for multiplicity and regime shifts, which we discuss below. A third implication is that political activism can be *welfare improving,* provided the conflict of interest between the decision maker and the informed agents is *large enough.* If it is too small (ρ is close to $\bar{\rho}$, meaning that the policy maker needs relatively little persuasion from the lobbyists to act), the confirmation effect dominates, and society is worse off than with a single activist.

To understand how the *lack of coordination* among the agents can lead to the decision maker's being either better off (high-trust case) or worse off (low-trust case), one can think of the signals independently provided by the other $n-1$ agents as helping her to screen between an n-th activist with a high signal, and one with a low signal. The activist knows that his desired policy will be chosen only if enough others show up to lobby. He is more optimistic about this turnout, and therefore more willing to invest the cost c, when he has received $s = h$ than $s = l$, since private signals are positively correlated. Most importantly, this *"screening technology"* is *endogenous,* since it depends on the strategy used by the other activists. When their actions are not very informative, meaning that they almost always behave as if they have received a high signal, screening is ineffective, because the conditional expectation of turnout does not differ much across the two states $s \in \{h, l\}$. Conversely, when the others act more discriminately, a lobbyist with a low signal is much more pessimistic about whether the quorum required to convince the planner will be met, than one with a high signal. His incentive to lobby is correspondingly lower, and in equilibrium this translates into a lower probability of misrepresentation.

B Regime shifts

Proposition 1 may also be useful to explain regime shifts in activism, such as those described in the introduction. For instance, an interesting feature of the growth of lobbying is the US is that it occurred in waves; Wilson [1973] notes three major, lasting waves between 1800 and 1940.[22] More recently, the Reagan presidency saw a sharp and persistent increase in the intensity of lobbying; see Figure 4. This change was sustained not only under the Bush administration, but also the Clinton one. While clearly not an empirical test of our model, such a sudden and "irreversible" shift is consistent with Figure 3, which shows that a temporary reduction in the "ideological distance" $\overline{\rho} - \rho$ (such as occurs when

[22] Another example is the large and persistent wave of public protests experienced by West Germany starting in 1980 (see Koopmans [1993]).

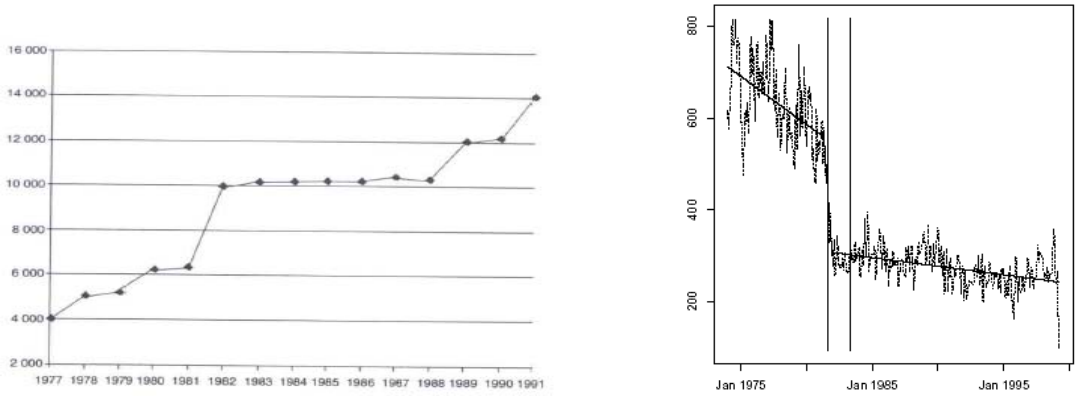

Figure 4: regime shifts in US political activism. a) The left panel shows Washington representatives of special interests (source: Petracca [1992]); b) The right panel shows election filings for new union representations (source: Farber and Western [2001]).

an administration more friendly to the interests of corporate lobbyists comes to power) can indeed trigger a permanent shift to a regime of more intensive, and socially more costly, lobbying.

There are also examples of negative waves, characterized by a sharp collapse of activism. Remarkably, the very same ideological "shock" as discussed earlier provides an instance of this converse scenario: Ronald Reagan's accession to the presidency in 1980 was immediately followed by a sharp drop in union activity, as measured by elections for new representations; as shown on Figure 4.b. As Farber and Western [2001] report,

> *"We find that the sharp decline in election activity follows the inauguration of president Reagan but precedes the air-traffic controllers' strike and new appointments to the Labor Board,"*

which are the anti-union measures subsequently taken by the administration. Furthermore, this downward shift (clearly distinguishable from the preexisting negative trend) extended well behind the Reagan tenure, and into years of Democratic administration.

We thus note from the conjunction of both examples that the model's main (and a priori non-obvious) comparative statics prediction appears consistent with the recent US experience: a reduction in ideological distance from the government (industry special interests) tends to bring about a high-intensity lobbying regime, while conversely an increase (labor) tends to precipitate a low lobbying-intensity regime. Moreover, in both cases, even if ρ later shifts back to its earlier level, the system remains in the new equilibrium.

IV Welfare and the organization of influence groups

One of our aims is to investigate how the "industrial organization" of political activism affect the informativeness of lobbying, the potential for multiple regimes, and ultimately social welfare. We shall therefore study the equilibrium when lobbyists can communicate and coordinate their actions, then compare the resulting utility levels of both the policy maker and the activists to those that prevail when the latter act independently, as in the previous section.

A Lobbying with coordination

We have so far assumed that the different interest groups acted independently, based on their correlated but privately observed signals. Yet when seeing several unions or industry groups in related sectors simultaneously lobby for import protection, or several environmental groups all lobbying for cleaner air, a policy maker would surely react differently if she thought that their actions were based on a common set of signals –whether exogenously or as the result of deliberate concertation among them. Conversely, if different groups have access to the same information, they will have strong incentives to coordinate their actions (in an incentive-compatible way) so as to avoid any equilibria that are Pareto-dominated for them. And even when they initially do not observe each other's signals, if they are able to communicate they may decide to share them, and then again coordinate on the best (self-enforcing) course of action. This situation corresponds for instance to activists who have access to a communication device such as a trade newspaper or e-mail group, a common lobbying firm, or a confederation of unions such as the AFL-CIO, allowing them to aggregate their signals and coordinate their expectations. Another example may be that of centralized bargaining with the policy maker.

To study these issues, we shall now study the lobbying game with coordination among the activists. More precisely, we first take as a given that they observe each other's signals, and allow them to coordinate away from Pareto-inferior equilibria.[23] Then, in a second step, we show that they are actually willing to truthfully share information, given that they will later be able to coordinate their actions in the self-enforcing way just described.

Proposition 2 *1) When there are $n \geq 1$ lobbyists who observe each other's signals, there is a unique symmetric equilibrium with activism that is (sender) coalition-proof. It is such that all act as a single agent, by playing a perfectly correlated mixed strategy; thus, only*

[23]This is thus not an assumption on behavior –in particular, there is no commitment ability–but only a refinement of the equilibrium set. Formally, we require coalition proofness (Bernheim, Peleg and Whinston (1987)), among the "senders" (the activists) of this game of communication (the policy maker being the "receiver").

two outcomes may occur in equilibrium: either no one lobbies, or everyone does. In the latter event, the decision maker's posterior is equal to $\mu_{n,n}(x,\rho) = \overline{\rho}$*, and the active policy is implemented with probability* y_1^**. If less than all lobbyists are active, the status quo is always chosen.*

2) When agents are able to coordinate away from Pareto-dominated outcomes, the sharing of private signals is incentive-compatible. In fact, information-sharing followed by perfect correlation of lobbying activities, as described above, remains a (sender) coalition-proof equilibrium of the two-stage game where communication among activists precedes lobbying decisions.

From here on, coordination among lobbyists will refer to situations described by this proposition (whether part (1) or part (2)). The intuition for the results is simple. Let us first take a common set of signals as given. Since agents need to use an informative strategy to convince the policy maker, their probability of lobbying must be increasing in the number $m \leq n$ of positive signals ($s = h$) that they received. Thus, generically, they will remain inactive when m is below some threshold $\bar{m}$, mix when $m = \bar{m}$, and lobby with probability one when $m > \bar{m}$. Conversely, the policy maker's strategy is nondecreasing in the number of active lobbyists. Suppose now that when $m = \bar{m}$, lobbyists mix in a less than fully coordinated way (e.g., independently). Each one must then be indifferent, given the mixing strategies of the others. Given the policy maker's decision rule, however, the expected benefit from lobbying is supermodular in agents' strategies: if all of them except j set $x = 1$ when $m = \bar{m}$, then j is no longer indifferent, but strictly prefers to also set $x = 1$. Lobbying with probability one when $m = \bar{m}$ would thus yield a Pareto improvement, and activists with the ability to coordinate would deviate to this behavior. Finally, what makes the sharing of private signal incentive-compatible is the fact that the agents have common preferences over policy outcomes, and that in the state of the world where their reporting or not reporting their signal could make a difference (namely, when all others are actively lobbying), they are at a point of indifference.[24]

Proposition 2 shows that a signaling model with a single interest group, or which abstracts from the difficulty of communication and coordination among influence seekers, will have trouble explaining phenomena like a multiplicity of regimes (e.g., the very different levels of lobbying and labor activism in otherwise similar countries), as well as sudden changes in the levels of strikes and public protests. It also implies that ignoring the possibility that coordination might be difficult to achieve would preclude analyzing

[24]The equilibrium that we describe need not be the only (sender) coalition-proof one in the two-stage game. We show, however, that it is the only one that exists given that the receiver (decision maker) expects the lobbyists to share their information –that is, given the response strategy that he uses in the equilibrium under consideration.

how the "industrial organization" of interest groups –e.g., whether there are a few large ones or many small ones– affects public decisions and social welfare. Indeed, recalling the welfare result shown earlier for the single-agent case, we have:[25]

Corollary 1 *When $n = 1$, or when lobbyists coordinate, social welfare is always lower than in the equilibrium with lobbying than in the one without, independently of the number of informed agents. Yet trying to discourage lobbying by increasing its cost c would, at the margin, unambiguously reduce welfare.*

There are, moreover, many factors that can hinder coordination among activists or influence groups, even when communication is relatively easy and they have access to a public randomization device. First, their interests with respect to the setting of policy may be only imperfectly aligned. Alternatively, unions, parties, churches and similar organizations may derive private benefits from their autonomy (control rights), due to an agency problem between themselves and the larger constituencies they represent.[26] Perhaps most surprisingly, we shall see in the next section that even when all activists have perfectly congruent preferences and face no agency problem, they may still prefer (and commit) to remain uncoordinated, because the heightened overall level of activism that results allows them to manipulate policy more effectively.

B The optimal organization of influence activities

We now compare coordinated and uncoordinated lobbying, focussing again on the case where $n = 3$. Another important implication of Proposition 1 is that when the deadweight loss of lobbying λc is relatively small and the high-trust equilibrium prevails (e.g., when $\rho < \rho_1$), the policy maker has a clear preference against coordination among informed agents. Indeed, social welfare in a high-trust equilibrium is higher than when in a world with no lobbying, whereas Corollary 1 shows that when activists coordinate, it is lower. When lack of coordination leads to a low-trust equilibrium, there is also a net welfare loss; how it compares to that which prevails under coordination remains to be assessed. One would also like to know the lobbyists' own preferences over their degree of coordination.

We shall study these issues for the case where the precision of private signals is high, although still not perfect. This assumption is made to simplify the analysis, but $\xi = 1$ is

[25] The qualifications mentioned in footnote 16 thus also apply to Corollary 1.

[26] For instance Wilson [1973, Chapter 3] cites the example of three major Jewish organizations, the American Jewish Congress, the American Jewish Committee and the Anti-Defamation League of B'nai B'rith, which *"...never fully settled the question of domain, [...] and the resulting rivalry has frequently been intense and on one occasion led to a major piece of self-analysis, the MacIver report. This report recommended [...] subordination to a larger coordinating agency, but of course for many agencies involved that was no solution at all, because joining such a body would only further reduce autonomy..."*.

also the limiting case on which the previous literature has focussed. We shall see, perhaps surprisingly, that there are circumstances where the policy maker actually prefers lobbyists to coordinate their actions; and even situations where the lobbyists would like to commit not to coordinate.

The first result characterizes the policy maker's preferences over the organization of lobbies, when their signals are very informative.

Proposition 3 *There is a threshold $\xi^* < 1$ on the precision of private signals such that, when $\xi > \xi^*$, and for any λ :*
1) the policy maker prefers activists to be divided if the resulting equilibrium is of the high-trust type (e.g., when $\rho < \rho_1$);
2) if lack of coordination will lead to a low-trust equilibrium (e.g., when $\rho > \rho_2$), on the other hand, she prefers to face a coordinated group of activists.

The intuition is as follows. For ξ high enough agents' signals are highly correlated, and in both the low-trust and cooperative equilibria the policy a is implemented only when all n of them actively lobby. Moreover, the decision maker's posterior in this event is the same across both equilibria, namely $\bar{\rho}$. When agents act independently, however, the event $\mathcal{I}_{3,3}$ is better news (for a given mixing probability x) than when they coordinate, because it is based on three independent signals. Lobbyists can thus afford to be less truthful in a low-trust equilibrium, which means that the average probability of lobbying is higher. Therefore so are total lobbying costs, even though the policy maker is, on average, no better informed than under coordination.

We now turn to the preferences of the lobbyists:

Proposition 4 *There is a threshold $\xi^{**} < 1$ on the precision of private signals such that, when $\xi > \xi^{**}$, non-coordination is preferred by the lobbyists, independently of what equilibrium it leads to.*

To understand this result recall that, in all cases, an agent's expected surplus from lobbying when he receives a negative signal is zero. One can thus focus the comparison on the case of a positive signal. Given a high precision, this signal is most likely correct, and the other lobbyists will have received the same information. The issue is therefore how responsive the planner will be when everyone lobbies. She is most responsive in the high-trust equilibrium ($y_3 = 1$), since that is when agents are the most credible. The latter would thus rather be in this equilibrium, where they gain credibility by submitting themselves to a greater risk of contradiction by others, than in the coordinated equilibrium where they are expected to collude against the planner. In the low-trust equilibrium agents

use an even more uninformative strategy than under coordination, but the planner's responsiveness is nonetheless greater ($y_3 > y_3^C$), because she must compensate them for the risk that others may not show up to help them press their case. This, in turn, generates a greater surplus for high types than under coordination.

Propositions 3 and 4 together characterize the preferences of all the players in the two main equilibria. This allows us to spell out when there will be agreement or disagreement between the policy maker and the interest groups over what organizational form is most desirable.

Proposition 5 *There is a* $\widetilde{\xi} < 1$ *such that for,* $\xi > \widetilde{\xi}$*, there are two thresholds* ρ_3 *and* ρ_4 *with* $\rho_3 < \rho_4$*, such that:*
1) when $\rho < \rho_3$*, non-coordination of interest groups is unanimously preferred, whether it leads to a low-trust or a low-trust equilibrium;*
2) when $\rho > \rho_4$*, coordination is unanimously preferred if non-coordinated action will lead to a low-trust equilibrium (e.g., if* $\rho_2 < \rho_4$*).*

Thus, when the ideological distance between the policy maker and the interest groups is large (ρ is relatively low), one is likely to see her taking measures (e.g., changing the legislative or institutional framework) that make it more difficult for interest groups to coalesce and act in unison. Notably, the interest groups themselves might (ex ante) support such measures, because they improve their credibility. While we are not aware of any empirical work on this issue, this credibility-through-decentralization motive may be another reason (apart from private benefits of control) behind Wilson's [1973] observation that political organizations with similar constituencies and objectives are nonetheless very attached to their independence. Conversely, when the expected disagreement is small the government will try to foster coordinated action, for example by initiating or requiring centralized bargaining. An example may be the policy of *"concertazione"* through which left wing governments in Italy tried, in the early nineties, to institute direct negotiations over labor policies with the major unions.

V Many lobbyists

The assumption of a small number of interest groups who act strategically is realistic: typically, only a few major trade unions, industrial sectors or parties have significant influence. Each of these large groups can also be interpreted as a coalition of many smaller actors who coordinate their actions, as in Section IV.B. Restricting attention to $n = 3$ lobbyists also allowed us to simplify the strategic problem and convey the key intuitions

in the most transparent way. It is important to note, however, that these insights extend to an arbitrary number of interest groups.

For instance, it is intuitive that with more lobbyists, there are more potential equilibria, each associated to a different endogenous action threshold for the policy maker –the minimal number $j \leq n$ of active lobbyists that will convince her to depart from the status quo. Moreover, all equilibria will again be shaped by either the confirmation effect, which reduces incentive to be truthful and dominates in equilibria where the decision maker is not very responsive, or the discipline effect, which forces agents to be more credible and dominates in equilibria where the decision maker is very responsive.

Note first that the action threshold j cannot be less then $\lceil n/2 \rceil$, the smallest integer strictly larger then $n/2$: since all signals are of equal precision, when a "majority" of lobbyists are inactive the decision maker's posterior is below her prior, even in the best-case scenario where she believes that no one ever lies. Without loss of generality, we shall focus here on the case where n is odd, so that $\lceil n/2 \rceil = (n+1)/2$.[27] Obviously, the higher is the number of active agents, the stronger is the confirmation effect, and the weaker is the discipline effect. Consider the two extremes. When $j = n$ there is only the positive informational externality: the unanimous support of others makes it easier to convince the policy maker, thereby allowing each lobbyist to be less truthful than when he is alone. Conversely, when $j = (n+1)/2$ the negative informational externality always dominates. Indeed, in the pivotal event a lobbyist finds himself in the company of the same number $(n-1)/2$ of active and inactive lobbyists; as the former always lie with non-zero probability, the positive signal that they collectively convey to the policy maker is less credible than the negative signal collectively conveyed by the silent agents. We can thus conclude that there is a j^*, with $(n+1)/2 \leq j^* < n$, such that in any equilibrium with $j \leq j^*$, agents are forced to be more informative than when they are alone, while in any equilibrium with $j > j^*$ the opposite is true. We shall refer to these two classes as *high-* and *low-trust* equilibria respectively, and to the two extreme ones which bound them as the *maximal-trust* ($j = \lceil n/2 \rceil$) and *minimal-trust* ($j = n$) equilibria. The following result shows that the key insights of Proposition 1 extend to an arbitrary number of agents:[28]

[27] Proposition 6 below holds for any $n \geq 3$, however. Note also that the assumption of symmetry in lobbyists' signals is without loss of generality. If they were of different precision this would only change the lower bound on the size of "majority" required to convince the policy maker.

[28] Because the proof follows the same logic as that of Proposition 1 we omit it here, and present only an informal discussion. The complete proof is available from the authors.

Proposition 6 *Under the same assumptions as in the previous sections, for any number of lobbyists $n \geq 3$ there exist two thresholds $\widehat{\rho}_1$ and $\widehat{\rho}_2$ in $[\underline{\rho}, \bar{\rho}]$, such that:*

1. *for all $\rho \geq \widehat{\rho}_1$ there exists a "minimal-trust" equilibrium, $x_{n,n}(\rho) > x_1(\rho)$, where the presence of the other agents reduces each one's incentives to be truthful so much that the decision maker pays attention only when all n agents actively lobby. For ρ high enough, moreover, this is the only equilibrium with activism.*

2. *for all $\rho < \widehat{\rho}_2$, if the signal precision ξ is high enough or n is sufficiently large, there exists a "maximal-trust" equilibrium, $x_{n,\lceil n/2 \rceil} < x_1(\rho)$, where the presence of the other agents disciplines each lobbyist so much that the decision maker reacts even when only a simple majority $\lceil n/2 \rceil$ of them are active.*

3. *There might be multiple equilibria with lobbying, but in any of them the probability x that a low type misrepresents must lie between $x_{n,\lceil n/2 \rceil}(\rho)$ and $x_{n,n}(\rho)$.*

More generally, each possible equilibrium corresponds to an action threshold $j \in \{\lceil n/2 \rceil, ...n\}$ for the decision maker, and is again characterized by an informativeness and an incentive-compatibility constraint. The informativeness constraint expresses the fact that it takes exactly j active lobbyists to raise the decision maker's posterior to the level $\bar{\rho}$ where she is just willing to act:

$$\mu_{n,j}(x, \rho) \equiv \Pr[\theta = H \mid j; x, \rho] = \overline{\rho}. \tag{13}$$

It is easy to see that the solution $x_{n,j}(\rho)$ to this equation, when it exists, is decreasing in j. As to the incentive-compatibility constraint, it expresses a low-type's willingness to randomize:

$$u_l^j(y; x, \rho) \equiv \sum_{\theta=H,L} \Pr(\theta \mid l)\, b_\theta [y \cdot \pi(j-1; x, \rho \mid \theta) + (1-y)\, \pi(j; x, \rho \mid \theta)] = c, \tag{14}$$

where y denotes the probability that the policy maker chooses action a when exactly j lobbyists are active, and $\pi(k; x, \rho \mid \theta)$ is the probability that k other lobbyists are active in state θ (note that $\pi(n; x, \rho \mid \theta) \equiv 0$). The left-hand side of (14) measures the expected benefit from lobbying, which again is reduced by the free-rider effect $-y\pi(j; x, \rho, \theta)$. For any given ρ, an equilibrium with decision threshold $j \in \{\lceil n/2 \rceil, ...n\}$ exists if and only if the system (13)-(14) has a solution $(x_{n,j}(\rho), y_{n,j}(\rho)) \in [0,1]^2$.

To understand why low-trust equilibria (with high values of j) are more likely at high values of ρ (and vice-versa for low values of ρ), note from (13) that when ρ is high, lobbyists do not need to be very informative to convince the policy-maker, so x will be

high. A high ρ and relatively high x both imply that, with high probability, there will be many active lobbyists, so any of them is likely to be pivotal only in an event characterized by a high "turnout" – that is, by a high j. In particular, when ρ is high enough, for any $j < n$ the probability that more than j lobbyists will turn out is sufficiently high for the free-rider effect to rule out any equilibrium with threshold j.[29]

Finally, it is easy to see why one must always have $x \in \left[x_{n,\lceil n/2 \rceil}(\rho), x_{n,n}(\rho)\right]$. If $x > x_{n,n}(\rho)$ the policy maker will never be convinced even when all lobbyists are active, so one cannot have an equilibrium with lobbying. Conversely, if $x < x_{n,\lceil n/2 \rceil}(\rho)$ the lobbyists are so informative that she will act as if they never misrepresent their signals; but if c is relatively small, which we are assuming, a low type faced with such an accommodating decision-maker would find it profitable to systematically lobby.

VI Concluding comments

There are several directions in which our simple model of multiple interest groups could be usefully extended. First, the activists may have only imperfectly aligned, or even opposing interests, with respect to the setting of policy. While we have shown that pressure groups may be hurt even by the presence of like-minded others, and even when they can coordinate their actions, divergent preferences would be another important determinant of the policy maker's ability to extract their information. A second force that might hinder coordination is that political organizations such as unions, parties and the like may value their own autonomy –being independent entities with meaningful control rights– due to an agency problem between themselves (leadership, "apparatchiks") and the larger constituencies they represent. More generally, the "industrial organization" of political and social activism remains a promising avenue of research.

[29] Formally, $\lim_{\rho \to \bar{\rho}} \pi(j-1; x, \rho \,|\, \theta) = \lim_{\rho \to \bar{\rho}} \pi(j; x, \rho \,|\, \theta) = 0$, implying $u_l^j(y; x, \rho) < c$ for any $y \geq 0$.

Appendix

A. Proof of Proposition 1

We start with two lemmata establishing the general claims made in at the end of Section II about equilibria with activism, that is, where $x(l) > 0$ and $x(h)$ is above some arbitrarily small but fixed $\varepsilon > 0$. The first one shows that agents with a high signal actually lobby with probability one, provided b_H/b_L is above a threshold β^*. The second one shows that, for c below some threshold c^*, the policy maker responds less to lobbying than if she believed that activists never lied: unless all three of them actively lobby, she will not choose their preferred policy a with probability one (thus, $y_2 < 1$).

Lemma 1 *Fix any $\varepsilon > 0$. There exists a β^* such that, if $b_H/b_L > \beta^*$, then in any equilibrium with activism, $x(h)$ must equal* 1.

Proof. We can write the expected benefit of lobbying for an agent who has observed a signal $s = h, l$ as:

$$u_s\left(y_2, y_3; \tilde{x}, \rho\right) \equiv \sum_{\theta=H,L} \Pr\left(\theta \mid s\right) b_\theta \left[y_2 \pi_1(\tilde{x}, \rho \,|\theta\,) + (y_3 - y_2)\pi_2(\tilde{x}, \rho \,|\theta\,)\right]. \tag{A.1}$$

In any equilibrium with $x(l) > 0$, it must be that $u_l\left(y_2, y_3; \tilde{x}, \rho\right) \geq c$. We will show that, under the stated conditions, $\left(u_h - u_l\right)\left(y_2, y_3; \tilde{x}, \rho\right) > 0$, hence the desired result. The difference in incentives to lobby across the two types is

$$\begin{aligned} u_h - u_l &\equiv \sum_{\theta=H,L} \left[\Pr\left(\theta \mid h\right) - \Pr\left(\theta \mid l\right)\right] b_\theta \left[y_2 \pi_1(\tilde{x}, \rho \,|\theta\,) + (y_3 - y_2)\pi_2(\tilde{x}, \rho \,|\theta\,)\right] \\ &= \left[\Pr\left(H \mid h\right) - \Pr\left(H \mid l\right)\right] \times \left\{b_H \left[y_2 \pi_1(\tilde{x}, \rho \,|H\,) + (y_3 - y_2)\pi_2(\tilde{x}, \rho \,|H\,)\right]\right. \\ &\quad \left. - b_L \left[y_2 \pi_1(\tilde{x}, \rho \,|L\,) + (y_3 - y_2)\pi_2(\tilde{x}, \rho \,|L\,)\right]\right\}, \end{aligned}$$

so $u_h - u_l > 0$ if and only if

$$\frac{b_H}{b_L} > \frac{y_2 \pi_1(\tilde{x}, \rho \,|L\,) + (y_3 - y_2)\pi_2(\tilde{x}, \rho \,|L\,)}{y_2 \pi_1(\tilde{x}, \rho \,|H\,) + (y_3 - y_2)\pi_2(\tilde{x}, \rho \,|H\,)}. \tag{A.2}$$

It is easily verified that $\pi_2(\tilde{x}, \rho \,|L\,) < \pi_2(\tilde{x}, \rho \,|H\,)$. Therefore if $\pi_1(\tilde{x}, \rho \,|L\,) \leq \pi_1(\tilde{x}, \rho \,|H\,)$, this inequality is always verified, since $b_H > b_L$. Assume now that $\pi_1(\tilde{x}, \rho \,|L\,) > \pi_1(\tilde{x}, \rho \,|H\,)$. There are two cases to consider, depending on whether the planner is willing to act when two lobbyists are active, or requires all three.

Case 1: $y_2 = 0$. (A.2) then becomes $b_H/b_L > \pi_2(\tilde{x}, \rho \,|L\,)/\pi_2(\tilde{x}, \rho \,|H\,)$ and is thus always verified.

Case 2: $y_2 > 0$, so $y_3 = 1$. The fraction on the right-hand side of (A.2) is increasing in y_2, since its determinant is

$$\begin{aligned} & \pi_1(\tilde{x}, \rho \,|L)\pi_2(\tilde{x}, \rho \,|H) - \pi_1(\tilde{x}, \rho \,|H)\pi_2(\tilde{x}, \rho \,|L) \\ > \; & \pi_1(\tilde{x}, \rho \,|L)\pi_2(\tilde{x}, \rho \,|L) - \pi_1(\tilde{x}, \rho \,|H)\pi_2(\tilde{x}, \rho \,|L) \\ = \; & \pi_2(\tilde{x}, \rho \,|L)\left[\pi_1(\tilde{x}, \rho \,|L) - \pi_1(\tilde{x}, \rho \,|H)\right] > 0. \end{aligned}$$

We therefore need to verify (A.2) only at $y_2 = 1$ (and with $y_3 = 1$), which means

$$\frac{b_H}{b_L} > \frac{\pi_1(\tilde{x}, \rho \,|L)}{\pi_1(\tilde{x}, \rho \,|H)}. \tag{A.3}$$

Consider therefore:

$$\pi_1(\tilde{x} \,|H) = \left[\xi x(h) + (1-\xi)\, x(l)\right]\left[\xi\,(1 - x(h)) + (1-\xi)\,(1 - x(l))\right], \tag{A.4}$$

$$\pi_1(\tilde{x} \,|L) = \left[\xi x(l) + (1-\xi)\, x(h)\right]\left[\xi\,(1 - x(l)) + (1-\xi)\,(1 - x(h))\right]. \tag{A.5}$$

In any equilibrium with activism, $x(h) \geq \varepsilon$; moreover, it must be that $x(l) < x_{3,2}(\rho)$, or else $\mu_{3,2}(\tilde{x}, \rho) < \bar{\rho}$, so the decision maker would choose $y_2 = 0$, a contradiction. Thus $\pi_1(\tilde{x}, \rho \,|H)$, as a function of $(x(l), x(h))$, is strictly positive and bounded away from zero on the compact set $[0, x_{3,2}(\rho)] \times [\underline{x}, 1]$. Since $\pi_1(\tilde{x}, \rho \,|L) \leq 1$, it follows that

$$\beta^* \equiv \max\left\{ \frac{\pi_1(\tilde{x}, \rho \,|L)}{\pi_1(\tilde{x}, \rho \,|H)} \;\middle|\; (x(l), x(h)) \in [0, x_{3,2}(\rho)] \times [\underline{x}, 1] \right\}$$

is well-defined and finite. (Note, for use in Lemma 2, that while β^* depends on ε, it is independent of c). If $b_H/b_L > \beta^*$, therefore, then (A.2) holds, hence $u_h - u_l > 0$. ■

Lemma 2 *There is a $c^* > 0$ such that, for $c < c^*$, there is no equilibrium with activism in which $y_2 = 1$, that is, where the policy maker is as responsive as if lobbyists were always truthful (always chose $x(l) = 0$).*

Proof. If the policy maker believes that lobbyists act truthfully, her strategy will be $y_0 = y_1 = 0$ and $y_2 = y_3 = 1$. Indeed, she will be never be convinced to act (choose a) when only one lobbyist is active: given that agents have the same quality of information ξ, the activism of one is just offset by the inactivity of another, and the inactivity of the third therefore reduces the decision maker's posterior below her prior. Conversely, if two out of three agents are active, the decision maker's posterior will rise above $\bar{\rho}$ (by (2)), and she will act with probability $y_2 = y_3 = 1$. For such equilibria to exist, an activist's net incentive to lobby, given by (11), must be such that $u_l(1, 1; x, \rho) \leq$, where x now simply denotes $x(l)$, since $x(h) = 1$ by Lemma 1. Note that $u_l(1, 1; 0, \rho)$ and $u_l(1, 1; x_{3,2}(\rho), \rho)$

are strictly positive for any $\rho \in \left[\underline{\rho}, \overline{\rho}\right]$. Since the function $u_l(1,1;x,\rho)$ is concave in x, this implies that

$$c^* \equiv \min_{(x,\rho)\in[0,x_{3,2}(\rho)]\times\left[\underline{\rho},\overline{\rho}\right]} \{u_l(1,1;x,\rho)\} \tag{A.6}$$

is uniquely defined, and strictly positive.[30] For $c < c^*$, $u_l(1,1,x,\rho) \leq c$ requires that $x > x_{3,2}(\rho)$, which in turn implies $\mu_{2,3}(x,\rho) < \bar{\rho}$ and hence $y_2 = 0$, a contradiction. There can thus be no equilibrium in which $y_2 = y_3 = 1$. ■

The next two lemmata establish certain key properties of the loci $x_{3,2}(\rho)$, $x_{3,3}(\rho)$ and $x_I(\rho)$ that were discussed and used in Section III.

Lemma 3 *The loci $x_{3,2}(\rho)$ and $x_{3,3}(\rho)$ are increasing in ρ, with $0 \leq x_{3,2}(\rho) < x_1(\rho) < x_{3,3}(\rho) \leq 1$, for all $\rho \in \left[\underline{\rho}, \overline{\rho}\right]$. Moreover, if only one agent is active, the decision maker's posterior is below $\overline{\rho}$, for any $x \in [0,1]$.*

Proof. Consider the function $\Psi(x,\rho) \equiv \left(1 + \frac{1-\rho}{\rho}x\right)^{-1}$, which is clearly decreasing in x. Since $\xi > 1/2$, we have:

$$\left(\frac{\xi}{1-\xi}\right)\left(\frac{1-\xi+\xi x}{\xi+(1-\xi)x}\right) > 1, \tag{A.7}$$

and therefore:

$$\begin{aligned}\mu_{3,2}(x,\rho;\xi) &\equiv \Pr(H\,|\mathcal{I}_{3,2}) = \Psi\left[\left(\frac{\xi}{1-\xi}\right)\left(\frac{1-\xi+\xi x}{\xi+(1-\xi)x}\right)^2, \rho\right] \\ &< \Psi\left[\frac{1-\xi+\xi x}{\xi+(1-\xi)x}, \rho\right] = \Pr(H\,|\mathcal{I}_1) \equiv \mu_1(x,\rho;\xi).\end{aligned}$$

Similarly, (A.7) implies that

$$\begin{aligned}\mu_{3,1}(x,\rho;\xi) &\equiv \Pr(H\,|\mathcal{I}_{3,1}) = \Psi\left[\left(\frac{\xi}{1-\xi}\right)^2\left(\frac{1-\xi+\xi x}{\xi+(1-\xi)x}\right), \rho\right] < \Psi\left(\frac{\xi}{1-\xi}, \rho\right) \\ &< \Psi(1,\rho) = \bar{\rho}.\end{aligned}$$

The claimed results follow from the definitions of $x_{3,2}(\rho)$ and $x_{3,3}(\rho)$, and the monotonicity of Ψ. ■

Lemma 4 *The locus $x_I(\rho)$ is decreasing in ρ. Moreover, for all x and ρ, $u_l(0,1;x,\rho) \geq c$ if and only if $x \geq x_I(\rho)$.*

[30] To verify concavity, note that $\partial^2 u(1,1,x,\rho)/\partial x^2$ is a convex combination of $\partial^2\pi_1(x\,|H)/\partial x^2 = -4(1-\xi)^2$ and $\partial^2\pi_1(x\,|L)/\partial x^2 = -4\xi^2$. Note also that the right-hand side of (A.6) is not an equilibrium variable, and is therefore independent of c.

Proof. By (12), $x_I(\rho)$ solves the implicit equation in x :

$$u_l(0,1;x,\rho) = \sum_{\theta=H,L} b_\theta \Pr(\theta \,|s=l\,)\, \pi_2(x\,|\theta) = c. \tag{A.8}$$

Differentiating yields $dx_I/d\rho = -\Phi_2/\Phi_1$, where

$$\begin{aligned}
\Phi_1 &= \sum_{\theta=H,L} b_\theta \Pr(\theta\,|s=l\,) \left(\frac{\partial \pi_2(x\,|\theta\,)}{\partial x}\right) > 0, \quad \text{and} \\
\Phi_2 &= \sum_{\theta=H,L} b_\theta \pi_2(x\,|\theta) \frac{\partial}{\partial \rho} \left(\Pr(\theta\,|s=l\,)\right) \\
&> \min_\theta \{b_\theta \pi_2(x\,|\theta)\} \cdot \frac{\partial}{\partial \rho} \left[\sum_{\theta=H,L} \Pr(\theta\,|s=l\,)\right] = 0,
\end{aligned}$$

where the second inequality follows from

$$b_L \pi_2(x\,|L\,) = b_L\left[1-\xi\,(1-x)\right]^2 < b_H\left[1-(1-\xi)\,(1-x)\right]^2 = b_H \pi_2(x\,|H\,)$$

and the fact that $\partial \Pr(H\,|s=l\,)/\partial\rho > 0$.

As to the property that $u_l(0,1;x,\rho) \geq c$ if and only if $x \geq x_I(\rho)$, it follows from the fact $u_l(0,1;x,\rho)$ is increasing in x. ■

We are now ready to prove Proposition 1 itself. Recall that $x_I(\rho)$ is decreasing in ρ while $x_{3,3}(\rho)$ and $x_{3,2}(\rho)$ are weakly increasing, with $x_{3,3}(\rho) \geq x_{3,2}(\rho)$ for all ρ. Moreover, $x_{3,3}(\bar{\rho}) = 1 > x_I(1)$ and $x_{3,2}(\underline{\rho}) = 0 < x_I(\underline{\rho})$. Therefore, the following thresholds are uniquely defined, with $\rho_1 < \rho_2$:

$$\begin{aligned}
\rho_1 &\equiv \min\left\{\rho \in \left[\underline{\rho},\overline{\rho}\right] \;\middle|\; x_{3,3}(\rho) \geq x_I(\rho)\right\}, \\
\rho_2 &\equiv \max\left\{\rho \in \left[\underline{\rho},\overline{\rho}\right] \;\middle|\; x_{3,2}(\rho) \leq x_I(\rho)\right\}.,
\end{aligned}$$

Next, note that the incentive constraint (11) is linear in (y_2, y_3), so it can be rewritten as:

$$y_2 u_l(1,1;x,\rho) + (y_3 - y_2)\, u_l(0,1;x,\rho) = c. \tag{A.9}$$

We now consider the three types of equilibria in turn.

1. Low-trust equilibrium. In this equilibrium $y_2 = 0$, so (A.9) becomes $y_3 \cdot u_l(0,1;x,\rho) = c$. For $\rho \geq \rho_1$ we have $x_{3,3}(\rho) \geq x_I(\rho)$, so $u_l(0,1;x_{3,3}(\rho),\rho) \geq c > 0 = u_l(0,0,x_{3,3}(\rho);\rho)$, by Lemma 4. Therefore, there is always a unique $y_3 \in [0,1]$ such that the incentive constraint (A.9) is satisfied by $x = x_{3,3}(\rho)$. Clearly $x_{3,3}(\rho)$ and y_3 then define an equilibrium, since these values respectively make the low-type agent and the policy maker indifferent. For $\rho < \rho_1$, on the other hand, $u_l(0,1;x_{3,3}(\rho);\rho) < c$, so one cannot have a low-trust equilibrium.

2. High-trust equilibrium. In this case $y_3 = 1$, so (A.9) becomes

$$y_2 \cdot u_l(1,1;x,\rho) + (1-y_2) \cdot u_l(0,1;x,\rho) = c. \tag{A.10}$$

By the definition of c^* in Lemma 2, when $c < c^*$ we have $u_l(1,1;x,\rho) > c$ for all $x \leq x_{3,2}(\rho)$. Therefore (A.10) is satisfied at $x = x_{3,2}(\rho)$ for some $y_2 \in [0,1]$ if and only if $u_l(0,1;x_{3,2}(\rho),\rho) \leq c$, that is, if and only if $x_{3,2}(\rho) \leq x_I(\rho)$. This, in turn, means that $\rho \leq \rho_2$.

3. Intermediate equilibrium. To see that for $\rho_1 \leq \rho \leq \rho_2$ there also exists an equilibrium with $x^* = x_I(\rho)$, note that in this range $x_I(\rho) \in [x_{3,2}(\rho), x_{3,3}(\rho)]$, so $y_2 = 0$ and $y_3 = 1$. The incentive constraint thus takes the form $u_l(0,1;x_I(\rho),\rho) = c$, which is satisfied by definition of $x_I(\rho)$. Conversely, it is easy to see that $x_I(\rho)$ is admissible as an equilibrium only when it lies between the two informativeness constraints $x_{3,2}(\rho)$ and $x_{3,3}(\rho)$, which means that ρ must lie in $[\rho_1, \rho_2]$.

Since, by Lemma 2, there can be no equilibrium with $y_2 = y_3 = 1$, this concludes the proof of existence and the complete characterization of, the equilibrium set.

We now turn to the comparison of social welfare in the two main types of equilibria with the no-activism and single-activist benchmarks (the third type of equilibrium, $x_I(\rho)$, represents a less interesting "hybrid"; see footnote 21). Let $W_{3,3}(\lambda)$ and $W_{2,3}(\lambda)$ respectively denote expected social welfare in the low- and high-trust equilibria, where λ is the deadweight loss per dollar of lobbying costs. As earlier, the number of active lobbyists is a random variable denoted ν, with values that now range from $i = 0$ to $i = 3$.

In a low-trust equilibrium the decision maker's strategy is $y_i = 0$ for $i \leq 2$ and $y_3 \in (0,1)$, the latter requiring indifference between choosing d or a. Therefore:

$$W_{3,3}(\lambda) = \sum_{i=0}^{3} \Pr(\nu = i) \cdot \{E_\theta[w(d,\theta)\,|\nu = i] - \lambda i c\} = W_0 - \lambda c \sum_{i=0}^{3} \Pr(s = i) \cdot i < W_0.$$

Furthermore, since there are now several activists who each lobby with a probability $x_{3,3}(\rho) > x_1(\rho)$, the total (expected) cost of lobbying $\lambda c \sum_{i=0}^{3} \Pr(s = i) \cdot i$ is also higher than with a single-agent, while the policy decision is equivalent (indifference between a and d). Therefore, $W_{3,3}(\lambda)$ is also below the level of social welfare in the single-agent case.

In a high-trust equilibrium, by contrast, $y_0 = y_1 = 0$, $y_2 \in (0,1)$ and $y_3 = 1$. Therefore:

$$\begin{aligned} W_{2,3}(\lambda) &= \sum_{i=0}^{3} \Pr(\nu = i) \cdot \{E_\theta[w(d,\theta)\,|\nu = i] - \lambda i c\} \\ + \Pr(\nu &= 3) \cdot \{E_\theta[a,\theta\,|\nu = 3] - E_\theta[d,\theta\,|\nu = 3]\} \\ &> W_0 - \lambda c \sum_{i=0}^{3} \Pr(s = i) \cdot i, \end{aligned}$$

since $E_\theta[w(a,\theta)\,|\nu=3] > E_\theta[w(d,\theta)\,|\nu=3]$ because the posterior after seeing three active lobbyists is larger than $\bar{\rho}$ (given that they play $x_{3,2}(\rho)$). By continuity, it follows that for all λ below some threshold $\lambda^*, W_{2,3}(\lambda) > W_0$. ■

B. Proof of Proposition 2

We proceed in four steps.

Step 1: perfect coordination of actions. When agents share the same information set, a lobbyist's strategy is a function $x(m)$ mapping the total number $m \in \{0,...n\}$ of "positive" ($s = h$) signals into a decision to be active or not. If, in some state m, one lobbyist strictly prefers a given course of action, so will all the all others, and all their actions will thus perfectly correlated. Assume now (by contradiction) that there is some state $\hat{m}$ in which some agents are choosing uncorrelated, or imperfectly correlated, mixed strategies. They must then be indifferent, and this implies that there can be at most one such state. Indeed, for any other $m > \widehat{m}$ agents put a strictly higher probability on the state being H, and will therefore strictly prefer to lobby (recall that they can coordinate on a profitable joint deviation). Given such a unique indifference threshold $\hat{m}$, the policy maker's posterior after observing i active lobbyists must the equal to $\Pr(H\,|m \leq \widehat{m})$ when $i = 0$, to $\Pr(H\,|m \geq \widehat{m})$ when $i = n$, and to $\Pr(H\,|m = \widehat{m})$ otherwise. This weak monotonicity of $\Pr(H \mid i)$ implies that her optimal reaction y_i must be non-decreasing in i. Moreover, there must exist two realizations i and i' with $i < i'$ and $y_i < y_{i'}$, otherwise agents would have no incentive to lobby. Such a reaction function for the policy maker, finally, implies that each agent's expected benefit from lobbying is increasing in the strategy x used by the others (supermodularity). Thus, if all except agent k increase their strategies to $x(\widehat{m}) = 1$, k will strictly prefer to set $x = 1$ as well. A collective deviation to a strategy $x'(\widehat{m}) = 1$ therefore yields a Pareto improvement for the lobbyists, contradicting coalition-proofness. Consequently, their strategies must always be perfectly correlated, implying that, in any state m, either $i = 0$ or $i = n$. ||

Step 2: equilibrium behavior. As usual, there always exists an equilibrium with no lobbying, in which the status quo is always chosen. Consider now an equilibrium with lobbying. Since it can not be that $\mu_{n,0}(\tilde{x},\rho) \geq \overline{\rho}$, the policy a will only be chosen when all lobbyists are active. The policy maker must then respond with a mixed strategy, otherwise there would always be lobbying, and it would be uninformative. For her to be indifferent, it must be that $\mu_{n,n}(x,\rho) = \bar{\rho}$. This requires that there be a state $1 \leq \hat{m} \leq n$ in which the lobbyists themselves (jointly) randomize. This, in turn, is made possible by the policy maker's randomizing with probability $y_n^* = (1/c)\sum_{\theta=H,L}\Pr(\theta\,|m)b_\theta$, where

$\Pr(\theta \,|m)$ is the probability that the state is θ given $\hat{m}$ favorable signals. Moreover, since the decision maker's posterior is increasing in the number of positive signals that will trigger collective action by the lobbyists, the threshold $\hat{m}$ is uniquely defined, by the double inequality $\mu_{n,n}(1, \rho \mid m = \hat{m}) \leq \bar{\rho} < \mu_{n,n}(1, \rho \mid m = \hat{m} + 1)$. Finally, if less than n lobbyists are active, we are out of equilibrium, and it is easy to find beliefs for the policy maker that cause her to remain at the status quo. The proposed behavior thus constitutes a Bayesian Nash equilibrium. One can show, moreover, that any other such equilibrium must be outcome-equivalent to this one, meaning that they can differ (in terms of strategies or beliefs) only off the equilibrium path. ||

Step 3: incentive compatibility of information sharing. Assume that all agents except j are revealing their true signals to all the other lobbyists. Consider now the cutpoint $\hat{m}$ defined above, namely the maximal number of high signals up to which lobbyists do not strictly prefer to be active, given the policy maker's decision rule. Clearly, the only relevant events for j's information-sharing decision are when either $k = \hat{m} - 1$ or $k = \hat{m}$ high signals have been observed by the others. Given that they report truthfully, when $k = \hat{m} - 1$ lobbyist j can trigger activism by the others with (at least) positive probability if he reports a high signal; recall that (correlated) equilibrium strategy calls for everyone to lobby when at least $\hat{m}$ high signals are reported (with probability such that the policy-maker's posterior is just equal to $\overline{\rho}$). When $k = \hat{m}$, lobbyist j can increase the probability of joint lobbying from a level lower than one, if equilibrium play calls for strict randomization at the event $\hat{m}$, to a probability of one. We now show that whether $k = \hat{m} - 1$ or $k = \hat{m}$, lobbyist j will find optimal to be truthful with his peers. Suppose first this his own signal is high. He will then know that there are a total $k + 1 \geq \hat{m}$ high signals, so by definition of $\hat{m}$ he will weakly prefer to induce the other lobbyists to be active by reporting truthfully, and then lobbying himself as well (which he must do since the policy maker responds only when everyone is active). Suppose now that lobbyist j's own signal is low, so that he knows that there is a maximum of $\hat{m}$ signals in total. By untruthfully reporting a high signal he can (weakly) increase the probability that the others will lobby, but given his information and the policy maker's strategy y_n^* he would then not find it strictly optimal to lobby himself. Reporting a high signal and then not lobbying can also not be preferable to truth-telling, since the policy maker will not choose the desired action a unless all lobbyists are active. Therefore, it can never be strictly optimal to be untruthful in this case either. ||

Step 4: coalition-proofness. Observe first that, when agents can coordinate their actions in the second stage (whether or not they share signals in the first stage), the planner will always require unanimity in lobbying ($i = n$) in order to choose a with positive

probability (denoted y). Otherwise, it would be profitable for the agents, whatever their signals, to jointly deviate to unanimous lobbying, and get their desired outcome for sure.

Assume now that the communication stage is not fully truthful, so that at the activism stage the agents make their individual decisions contingent only on some imperfect public signal (in the group) $\tilde{m}$ and their private signal s, as well as the equilibrium strategies x and y which they expect other lobbyists and the planner to play. We denote the resulting expected utility (net of lobbying costs) from that individually optimal action as $U^*(x, y \mid \tilde{m}, s)$. Clearly, it is less that what the same agent could expect if he was able to observe the actual number m of high signals received by the group, keeping everyone else's action fixed: by Blackwell's theorem, $U^*(x, y \mid \tilde{m}, s) < U^*(x, y \mid m, s)$, since $\tilde{m}$ is only a noisy version of m. Let us now decompose the second expected utility over the set M_1 of realizations of m which are such that agent under consideration would strictly prefer not to lobby, and the complementary set M_2 where he would weakly want to lobby –keeping again x and y fixed. Observing that once he knows the true m his own signal s becomes irrelevant, we have $U(x, y \mid m, s) = U(x, y \mid m)$, and

$$\begin{aligned} U^*(x, y \mid m, s) &= \sum_{m' \in M_1} \Pr(m') \cdot U^*(x, y \mid m, s) \\ &+ \sum_{m'' \in M_2} \Pr(m'') \cdot U^*(x, y \mid m, s) \\ &< \sum_{m'' \in M_2} \Pr(m'') \cdot U^*(1, y \mid m, s). \end{aligned} \tag{B.11}$$

Indeed, the first summation term is equal to zero, because the decision maker does not react unless everyone lobbies; as to the second one, it is clearly less that what the agent could expect if, in all such states m'', the others lobbied with probability 1 rather than x (given the decision maker's strategy y, which remains fixed throughout since we are looking at sender coalition-proofness). Now, if $m'' \in M_2 > 0$, meaning that the agent is weakly willing to lobby when others use the strategy x, then a fortiori he must *strictly* prefer to do so when they lobby with probability 1 (supermodularity). Recall now that, in our original equilibrium with truthful information-sharing among activists, m is precisely the threshold at which they become willing to randomize (given y). Hence any $m'' \in M_2$ must be strictly greater than m (or equal to it if $m = n$), so that in the information-sharing equilibrium agents would *actually* lobby with probability 1 in the event m''. The last summation term in (B.11) is thus exactly equal to the expected utility that the agent would get, under all such events m'', in the information-sharing equilibrium. In the events $m' \in M_1$ he could get no less than zero, which is what he was getting in the alternative non-information sharing outcome. We have thus proved that (given y),

in any equilibrium of the two-stage game where information is not truthfully shared in the first stage, every agent is worse off than in that where signals are shared, and actions subsequently coordinated. The proposed truthful-sharing and coordination strategies thus constitute a sender coalition-proof equilibrium of the two-stage game. Moreover, there is no other such equilibrium with the same strategy y for the decision maker. ■

C. Proof of Corollary 1

Let us denote the expected level of social welfare in the absence of lobbying as W_0. In a symmetric equilibrium with lobbying, we know from Proposition 2 that the number of informed agents who actively lobby is a random variable ν that takes only two values: either all are active ($\nu = 0$) or all of them are ($\nu = n$). Denoting as $\eta^*(\nu)$ an optimal action for the policy maker in each of these events, social welfare is simply:

$$W_1 = \sum_{i \in \{0,n\}} \Pr(\nu = i) \left\{ E_\theta \left[w\left(\eta^*(i), \theta\right) | \nu = i \right] - \lambda i c \right\},$$

where w is the payoff function defined in Figure 1.a. We know that $\eta^*(0) = d$, and that if there is lobbying the policy maker in state $\nu = n$ is indifferent between d and a. Thus:

$$\begin{aligned} W_1 &= \sum_{i \in \{0,n\}} \Pr(\nu = i) \cdot \left\{ E_\theta \left[w\left(d, \theta\right) | \nu = i \right] - \lambda i c \right\}, \\ &= E_\theta \left[w\left(d, \theta\right) \right] - \lambda c \sum_{i \in \{0,n\}} \Pr(s = i) \cdot i = W_0 - \lambda c \sum_{i \in \{0,n\}} \Pr(s = i) \cdot i, \quad \text{(C.12)} \end{aligned}$$

hence $W_1 < W_0$ since $\lambda c \sum_{i \in \{0,n\}} \Pr(s = i) \cdot i > 0$. Therefore, although the lobbyists do provide information, their net contribution to social welfare is negative. It is also obvious from (C.12) that an increase in the cost of lobbying (within the range of interest, $c < b_L$) is always socially detrimental. ■

D. Proof of Proposition 3

Lemma 5 *There exists a ξ_1' such that, for $\xi > \xi_1'$, in any equilibrium with coordination the informed agents are active with positive probability even when none of them observes a high signal.*

Proof. Let us denote by x the probability that (all) agents are active even when none of them has received a positive signal ($m = 0$). The policy maker's posterior when she observes that all the lobbyists are active ($\nu = n$) is:

$$\mu_C(x, \xi) \equiv \Psi\left(\frac{\xi^3 x + 1 - \xi^3}{(1-\xi)^3 x + 1 - (1-\xi)^3} \right). \quad \text{(D.13)}$$

In equilibrium, we have $\mu_C\left(x_C^*(\xi),\xi\right)=\bar{\rho}$. Since, as ξ tends to 1, $\mu_C\left(\cdot,\xi\right)$ converges to $\Psi\left(\cdot\right)$, which is a continuous function with $\Psi(1)>\bar{\rho}>\Psi(0)$, it must be that $x_C^*(\xi)>0$ for ξ large enough. This result also implies that for ξ high enough, agents will strictly prefer to lobby whenever one of them or more has received a high signal. ■

We now compare social welfare between the (informative) equilibrium of the game with coordination and those of the uncoordinated game. Recall that social welfare has two key aspects: the efficiency of the decision maker's action, and the total costs dissipated on lobbying. Since the number of agents remains fixed at $n=3$ (only their degree of coordination may vary), these costs are, in expectation, simply proportional to the average probability of activism.

1. High-trust equilibrium vs. coordination. By Proposition 1, the policy implemented in the high-trust equilibrium is always superior to that of the collusive equilibrium: in the latter case, the decision maker does no better than by always choosing the status quo, whereas in the former case she obtains a positive surplus by choosing her strictly preferred action ($y_3=1$) after observing three active lobbyists. Let us now show that, for ξ above a certain threshold $\xi_1>\xi_1'$, coordination by the informed agents has the added disadvantage that it always raises expected lobbying costs.

In a high-trust equilibrium, the strategy $x_{2,3}^*\left(\xi\right)$ of the low type is defined by:

$$\mu_{2,3}\left(x,\xi\right)=\Psi\left(\frac{\xi}{1-\xi}\left[\frac{\xi x+1-\xi}{\left(1-\xi\right)x+\xi}\right]^2\right)=\overline{\rho}, \tag{D.14}$$

so $\lim_{\xi\to1}\left(x_{2,3}^*\left(\xi\right)\right)=0$. Since agents randomize independently, the average probability of activism in this equilibrium is

$$\begin{aligned} C_{2,3}\left(\xi\right) &= \rho\left[\left(1-\xi\right)x_{2,3}^*+\xi\right]+\left(1-\rho\right)\left[\xi x_{2,3}^*+1-\xi\right] \\ &= \rho+\left(1-\rho\right)x_{2,3}^*+\left(1-x_{2,3}^*\right)\left(1-\xi\right)\left(1-2\rho\right). \end{aligned}$$

Therefore, $\lim_{\xi\to1}\left(C_{2,3}\left(\xi\right)\right)=\rho$. Consider now the average probability that a lobbyist is active under coordination:

$$C_C\left(\xi\right)=\rho\left[\left(1-\xi\right)^3x_C^*+1-\left(1-\xi\right)^3\right]+\left(1-\rho\right)\left[\xi^3x_C^*+1-\xi^3\right], \tag{D.15}$$

Hence:

$$\lim_{\xi\to1}\left[C_C\left(\xi\right)-C_{2,3}\left(\xi\right)\right]=\left(1-\rho\right)x_C^*\left(1\right)>0. \tag{D.16}$$

2. Low-trust equilibrium vs. coordination. By Proposition 1, in a low-trust equilibrium the decision maker does no better, allocatively speaking, than by always choosing the status quo. From the point of view of informational efficiency, this equilibrium is thus equivalent

to that with coordination. We will show, however, that the low-trust equilibrium always involves higher expected lobbying costs. Indeed, the condition defining informed agents' equilibrium strategy $x^*_{3,3}(\xi)$ is then

$$\mu_{3,3}(x,\xi) = \Psi\left(\left[\frac{\xi x + 1 - \xi}{(1-\xi)x + \xi}\right]^3\right) = \overline{\rho}, \tag{D.17}$$

which is the informativeness constraint when all agents are active. Comparing (D.17) with (D.13) shows that $x^*_C(1) = x^*_{3,3}(1)^3 > 0$. Moreover, the average lobbying probability in this equilibrium is

$$C_{3,3}(\xi) = \rho + (1-\rho)x^*_{3,3} + \left(1 - x^*_{3,3}\right)(1-\xi)(1-2\rho), \tag{D.18}$$

so with (D.15) this implies:

$$\lim_{\xi\to 1}\left[C_C(\xi) - C_{3,3}(\xi)\right] = (1-\rho)\left(x^*_{3,3}(1) - x^*_C(1)\right) > 0,$$

hence the result. ■

E. Proof of Proposition 4

In what follows we shall denote as $x_{3,3}(\xi)$ and $U_{3,3}(\xi)$ the strategy and unconditional expected utility, in a low-trust equilibrium, of an agent who received the signal $s = l$; and by $y_{3,3}(\xi)$ the decision maker's strategy when observing three active lobbyists. The same variables will be denoted with "C" subscripts in the equilibrium of the game with coordination, and with "$2,3$" subscripts in a high-trust equilibrium –except that $y_{2,3}(1)$ will now refer to the decision maker's mixing probability when *two* lobbyists are active (she chooses $y_3 = 1$ when three of them are).

Note first that, as ξ tends to 1, the agents' signals become almost perfectly correlated with the actual state, and with each other. Thus $\Pr(L \mid s = l), \Pr(s = l \mid L), \Pr(L \mid m = 0)$ and $\Pr(m = 0 \mid L)$ all tend to 1 (recall that $m \in \{0, ...3\}$ is the total number of high signals received by the three agents); and similarly for $\Pr(H \mid s = h), .., \Pr(m = 3 \mid L)$, etc.

1. Low-trust equilibrium. Since each agent either strictly prefers to lobby (when $s = h$), or is indifferent (when $s = l$), we have:

$$\lim_{\xi\to 1}(U_{3,3}(\xi)) = p(H)\left[y_{3,3}(1)b_H - c\right] + p(L)\left[x^2_{3,3}(1)y_{3,3}(1)b_L - c\right] = p(H)\left[y_{3,3}(1)b_H - c\right],$$

since the term in the second set of brackets equals zero, by the incentive constraint. With coordination, the corresponding expression is:

$$\lim_{\xi\to 1}(U_C(\xi)) = p(H)\left[y_C(1)b_H - c\right] + p(L)\left[y_C(1)b_L - c\right] = p(H)\left[y_C(1)b_H - c\right],$$

since the term in the second set of brackets is again equal to zero, making the agents indifferent between lobbying together or not at all. It follows that:

$$\lim_{\xi\to 1}\left(U_{3,3}(\xi)-U_C(\xi)\right)=p(H)\left(y_{3,3}(1)-y_C(1)\right)b_H=p(H)\left(\frac{c/b_L}{x_{3,3}^2(1)}-\frac{c/b_L}{1}\right)b_H>0,$$

where we have substituted in the values of $y_{3,3}(1)$ and $y_C(1)$ from the two incentive constraints.

2. High-trust equilibrium. Proceeding along the same lines, we have $\lim_{\xi\to 1}\left(U_{2,3}(\xi)\right)=p(H)\left[b_H-c\right]+p(L)\cdot 0$, due again to the incentive constraint when $s=l$ and the fact that, as ξ becomes close to 1, this event becomes perfectly correlated with $\theta=L$. Thus

$$\lim_{\xi\to 1}\left(U_{2,3}(\xi)-U_C(\xi)\right)=p(H)\left(1-y_C(1)\right)b_H>0,$$

hence the result. ■

F. Proof of Proposition 5

We showed that, for any given ρ, if ξ is large enough the low-trust equilibrium (when it exists) it is such that $U_{3,3}-U_C>0$. This is true in particular at $\rho=\underline{\rho}$, for ξ above some threshold $\tilde{\xi}$. From here on we shall *keep* ξ *fixed* above $\tilde{\xi}$, and *vary* ρ. By continuity, there exists a threshold $\rho_3>\underline{\rho}$ such that $U_{3,3}-U_C>0$ for all $\rho\in[\underline{\rho},\rho_3]$. Since, by Proposition 3, the decision maker also prefers the high-trust equilibrium to the coordinated outcome when ξ is above a given threshold, the first part of the proposition follows.

Consider now what happens when ρ converges to $\overline{\rho}$ (again, for fixed ξ). It is easy to see that both $x_{3,3}$ and x_C increase to $\lim_{\rho\to\overline{\rho}}(x_{3,3})=\lim_{\rho\to\overline{\rho}}(x_C)=1$. Therefore, in any state of the world, and in either equilibrium, all three agents will lobby with probability close to 1. This implies that:

$$\lim_{\rho\to\bar{\rho}}\left(U_{3,3}(\rho)-U_C(\rho)\right)=\left[y_{3,3}(\bar{\rho})b_H-c\right]-\left[y_C(\bar{\rho})b_H-c\right]=\left[y_{3,3}(1)-y_C(1)\right]b_H,$$

where the argument of the relevant functions that we make explicit in the notation is now ρ rather than ξ. The two incentive constraints now imply that

$$y_{3,3}(\bar{\rho})=\frac{c}{\sum_{\theta=H,L}\Pr\left(\theta\,|l\right)b_\theta}<\frac{c}{\sum_{\theta=H,L}\Pr\left(\theta\,|m=0\right)b_\theta}=y_C(\bar{\rho}),\tag{F.19}$$

since $\Pr\left(H\,|l\right)>\Pr\left(H\,|m=0\right)$ for all $\rho\in[0,\overline{\rho}]$. Therefore $\lim_{\rho\to\overline{\rho}}\left(y_{3,3}-y_C\right)<0$, and hence $\left(U_{3,3}-U_C\right)(\rho)<0$ for all ρ above some threshold $\rho_4<\bar{\rho}$. ■

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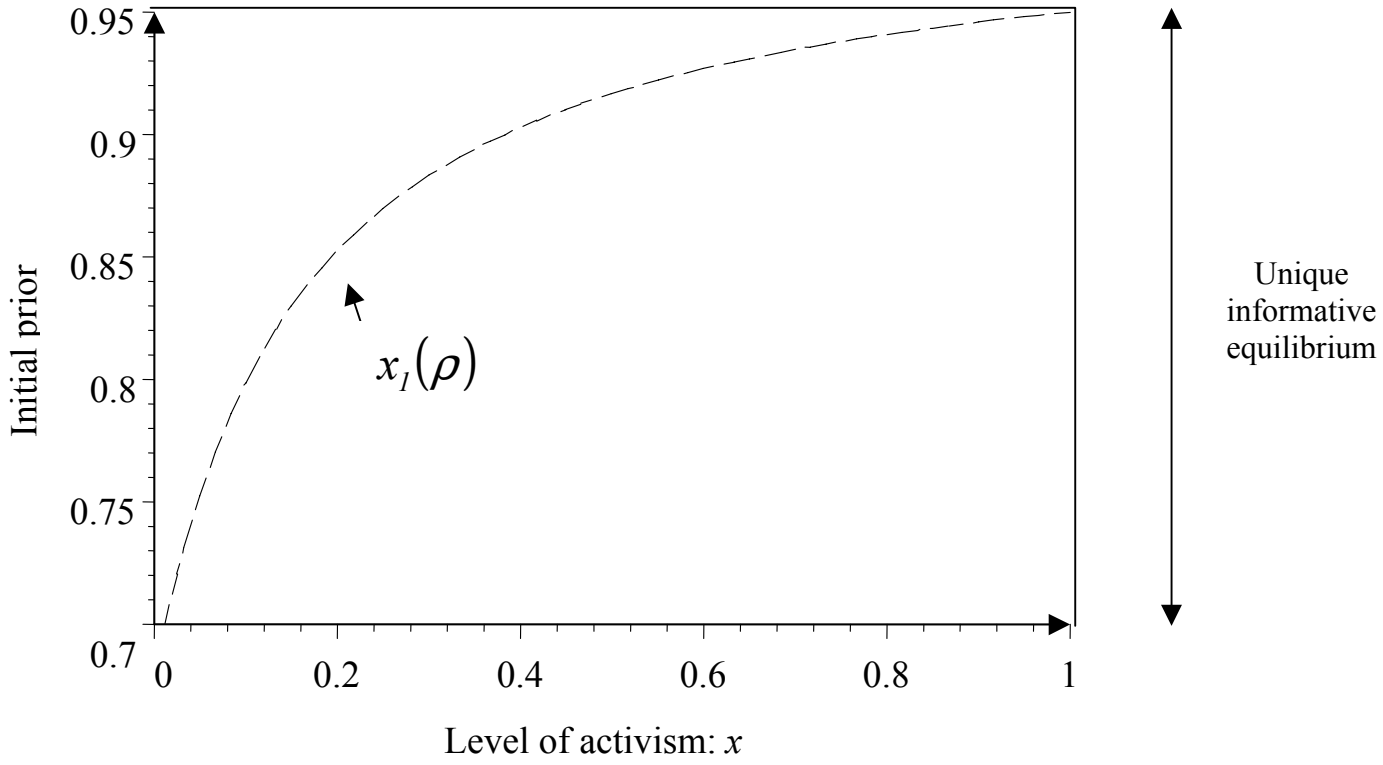
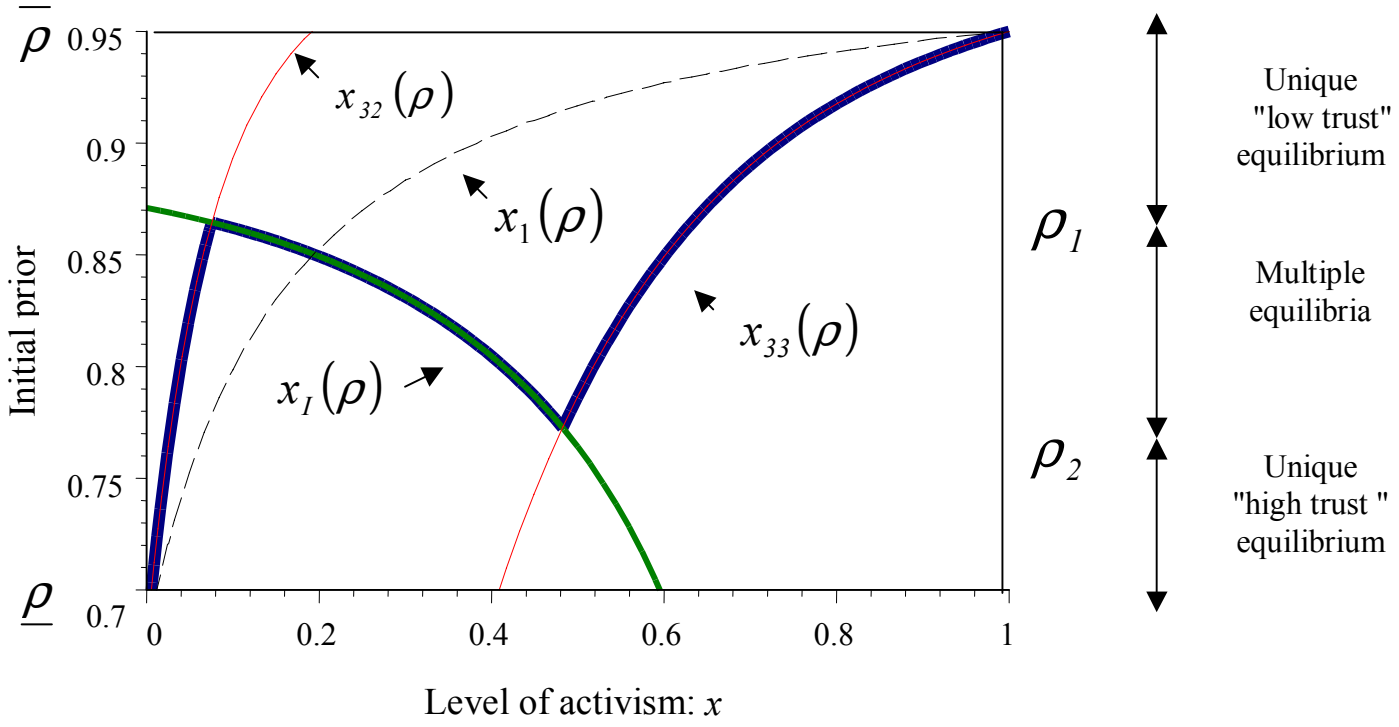


equilibrium level of activism following a low signal $(s = l)$, in the single-agent case.



informativeness constraints, incentive constraint, and equilibria in the 3-agent case.

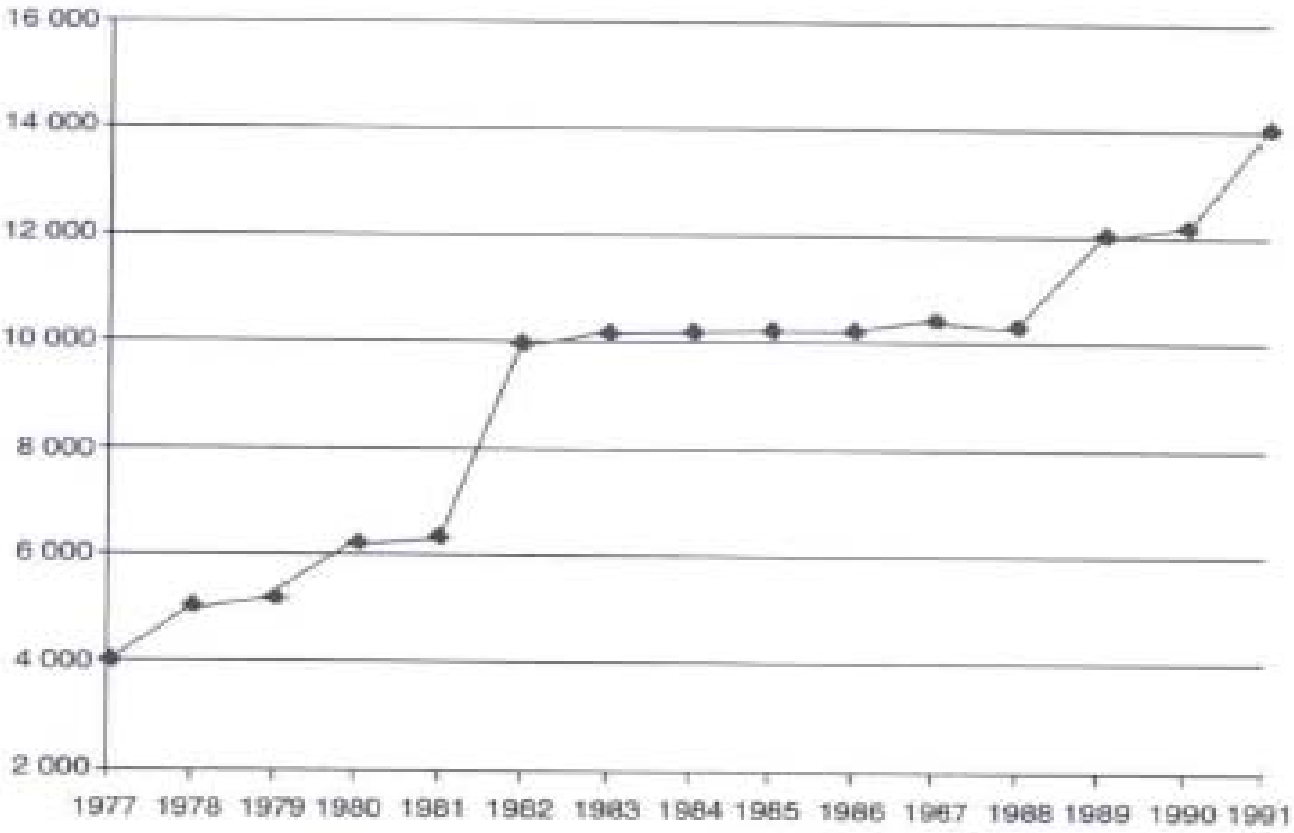


Figure 4, left panel

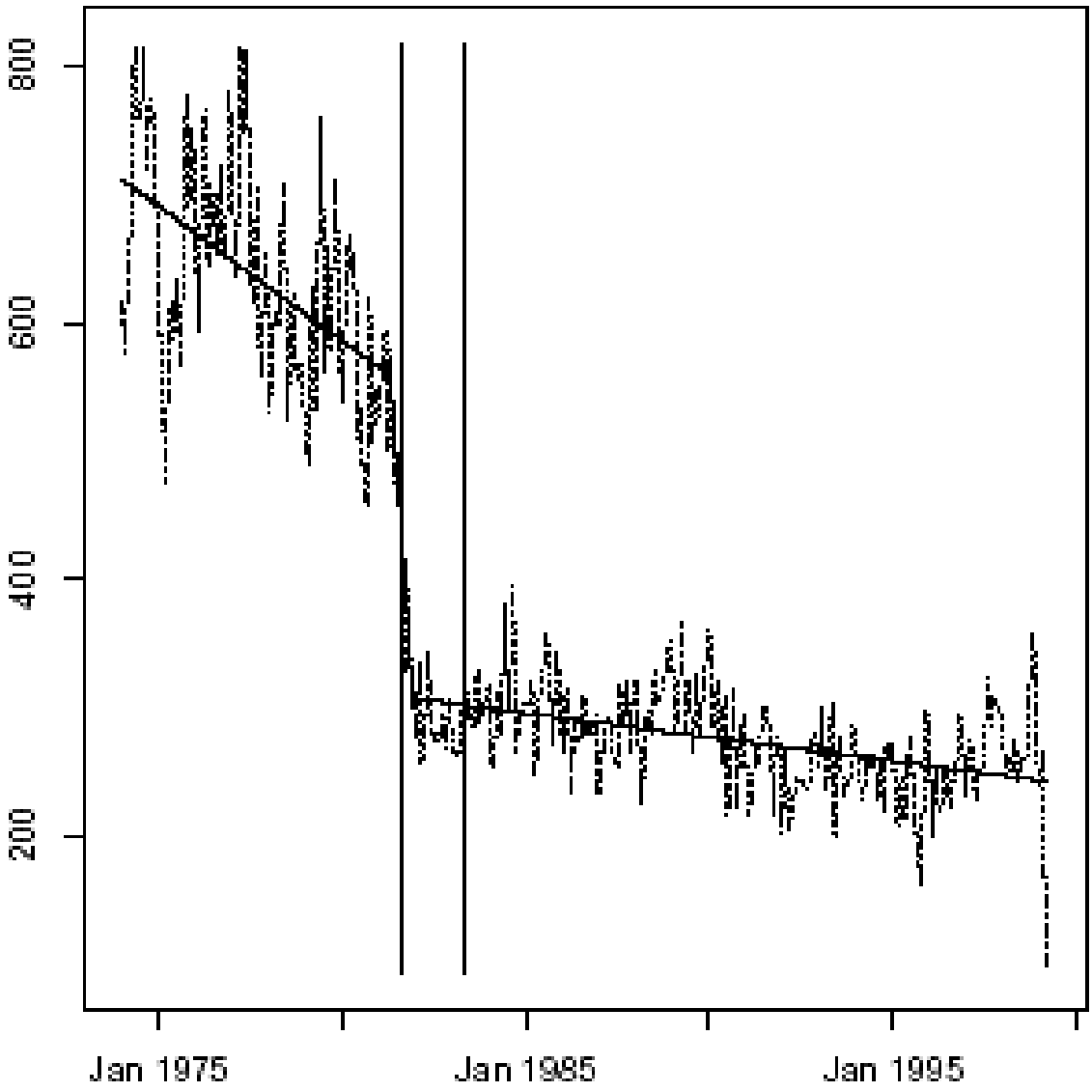


Figure 4, right panel