An Informational Theory of Coalitional Lobbying*

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Abstract

Policy advocates such as interest groups and bureaucrats often form tactical coalitions in order to advance their policy goals on specific issues, even if their interests differ. When do advocates form coalitions instead of lobbying separately? What is the impact of coalitions on welfare and policy moderation? To answer these questions I develop a model of informational lobbying between two advocates and a policymaker. The advocates develop policy proposals, either independently or jointly, and gather verifiable information about their quality. A coalition requires compromise, but reduces competition and can lead to a more effective use of information. I find that, when their interest divergence is moderate and the policymaker's alternative policy is weak, advocates use coalitions in order to filter (or "cherry-pick") the information they produce; when the policymaker's alternative policy is strong, in contrast, they use coalitions to aggregate their information. The welfare consequences of coalitional lobbying are thus ambiguous. Interest diversity has a non-monotonic effect on the level of policy compromise, and a high level of compromise can signal low quality policies.

Coalitional lobbying—defined as coordinated efforts by interests to lobby government with the aim of advancing a shared advocacy agenda (Nelson and Yackee, 2012)—is a common strategy both in the US (Baumgartner et al., 2009) and in the EU (Junk, 2020), a result of the fragmentation of the interest representation arena (Salisbury, 1990) and the increased levels of competition faced by lobbyists (Holyoke, 2011). Coalitions are not only common, but ranked among their top influence tactics by lobbyists (Schlozman and Tierney, 1986; Hula, 1999). Analytically, the phenomenon is distinct from collective action, since lobbying coalitions are formed by groups that have already solved their collective action problem (Hula, 1999), and from institutions of interest intermediation

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(e.g., peak industry associations; see Schmitter, 1977), since coalitions are often short-term and issue-specific. For these reasons lobbying coalitions have received considerable scholarly attention as a distinct and important aspect of interest influence in the policymaking process (e.g., Hojnacki, 1997; Phinney, 2017; Junk, 2019).

Are coalitions effective as an influence tactic? Their prevalence and the favorable perceptions held by lobbyists suggest this to be the case, but an initial set of empirical studies found a null or negative correlation between the use of a coalitional tactic and success on the policymaking arena (Haider-Markel, 2006; Mahoney and Baumgartner, 2004). More recent studies find conditional positive correlations: Nelson and Yackee (2012) find that coalitions showing a consensus support for a policy position and including members that can provide technical information are influential in federal agency rulemaking; Mahoney and Baumgartner (2015) find that coalitions involving government officials are likely to be successful in Congress; Dwidar (2022a,b) finds that the organizational and partisan diversity of a coalition's members predicts its influence in rulemaking, and Junk (2019) finds that diversity increases the likelihood of success of a coalition but only when the salience of the issue is high.

How do coalitions work? Early studies focused on a few broad motives for coalition-building: pooling resources at the cost of compromise (Hojnacki, 1997; Hula, 1999; Holyoke, 2009), and signaling to policymakers that there is broad and uniform support for a given policy proposal (Mahoney, 2007; Nelson and Yackee, 2012). Recent studies focus on an informational role of coalitions: by forming a coalition, interest groups send a costly signal to policymakers about the valence of their policy position (Dwidar, 2022b; Phinney, 2017). Similarly, Napolio (Forthcoming) argues that executive agencies form coalitions "as a costly signal to political overseers that certain bureaucratic policies are efficient, or likely to appropriately respond to a policy exigency."

The literature has shared so far an assumption that (as I will argue) has not been tested, and that has not been seriously interrogated theoretically, namely, that, when interest groups form a coalition, they aggregate their informational resources, or provide valuable information by the mere act of coalition-building. In this paper I analyze a simple model of informational lobbying in which interest groups (IGs) can either attempt to influence a policymaker individually or as a coalition. The model's predictions are consistent with arguments and empirical regularities found in the literature: under some conditions the IGs form a coalition to pool resources in equilibrium; and under plausible distributions of the parameters ideological diversity is correlated with the likelihood of success of coalitions, but coalition-building need not be correlated with success unconditionally. However, the model presents a new motivation for coalition-building, viz, to filter information that, while valuable for the policymaker, the IGs prefer to withhold in order to increase their influence.

In the model, the IGs are able to employ an information-filtering strategy when they are moderately diverse and the policymaker's alternative policy is weak. The signaling theory predicts, similarly, that moderately diverse IGs can form a coalition to increase their influence, but both the mechanism and the normative implications differ substantially: according to the signaling theory, forming a coalition credibly communicates valuable information that the IGs would not be able to transmit on their own, and this increases the welfare of both the IGs and the policymaker. In my model, the IGs form a coalition in order to reduce competition that would force them to reveal information that, while valuable to the policymaker, would decrease their influence. Thus, the coalition, when pursued for this motive, leads on average to worse policy outcomes from the perspective of the policymaker. In contrast to the assumption commonly made in the literature, coalitions can lead to *information collusion* rather than aggregation.

We can think of information collusion in the following way. If two groups send messages independently, they risk contradicting each other, and they may be forced to produce more information than they would if they could coordinate their messages. To fix ideas, suppose that there is a change in an environmental regulation that business as a whole favors. The regulator is willing to implement it if it is good for at least one of two industries and not too bad for the other one. In that case if the two industries can gather information about how effective the policy is on their industry, they are better off filtering their disclosures in order not to contradict each other. However, to implement this strategy, they have to also coordinate on the details of the regulation they advocate for, which requires them to find a compromise position.

To formalize the argument I start with a simple model of policymaking with *policy-specific* or *non-transferrable* valence based on Callander and Harstad (2015) and Hirsch and Shotts (2012), in which two IGs can choose policies on a uni-dimensional policy space, gather information about their valence, and provide verifiable information to a policymaker, who can implement one of the IGs' proposals or an alternative policy (which can be the status quo or the best proposal by an opposing "side" in the policy debate). The IGs can either choose policies and lobby independently or form a coalition, which entails lobbying for a common policy position. In equilibrium, if the IGs can only induce the policymaker to implement their proposal by aggregating their sources of information (which happens when the policymaker is in a strong bargaining position due to a good outside option), then the IGs form a coalition in order to pool resources, as, e.g., Hojnacki (1997) argues. However, if one IG alone is capable to induce the policymaker to adopt her policy recommendation (in the event that she finds favorable information about the policy's valence), then, in equilibrium, if the IGs decide to lobby independently, they compete for approval of their favorite policy, and are thus induced to reveal their information. If, on the other hand, they form a coalition, they can withhold unfavorable information about their policy's valence, and the policymaker will not infer that "no news is bad news" as in Milgrom and Roberts (1986) since information acquisition is endogenous (and costly) in the model, and thus the policymaker does not know if "bad news" were withheld or just not produced. The model thus features information collusion as in Gentzkow and Kamenica (2017b) but without the commitment assumption that is required by the Bayesian persuasion approach.

Literature.—The paper contributes mainly to the literature on lobbying coalitions cited above. The only political economy paper that I am aware of that studies coalitions in the context of informational lobbying is Martimort and Semenov (2008). The main message of that paper is that coalitions should be expected (because they are socially preferred) in issues where the divergence of interests between the policymaker and the IGs is small. My model is hardly comparable, but if we interpret the parameter q as a measure of the divergence of interests between the IGs and the policymaker, then my model produces the opposite prediction: when q is small (but above μ) a coalition is not socially preferred, and competition can occur in equilibrium. I'm not aware of empirical evidence that can speak to this disagreement.

Battaglini and Bénabou (2003) is relevant and similar to my approach, in that multiple IGs send information to convince a policymaker to adopt a policy; the IGs are homogeneous, however, which fundamentally changes the mechanics, and, moreover, leads to the same prediction as Martimort and Semenov (2008), which contrasts with the results of my model. The literature on multi-sender Bayesian persuasion is relevant (Gentzkow and Kamenica, 2017a,b,c; Li and Norman, 2018; Minaudier, 2019), and I borrow from it the insight that multiple lobbyists can "collude" against the decision maker.

I. The model

The players are two groups, $1, 2$, and a policymaker P. Each group $i = 1, 2$ chooses a policy $x_i \in \mathbb{R}$, which has an unknown non-transferrable valence or quality $y_{x_i} \in \{0, 1\}$. The players hold a common prior $\Pr(y_{x_i} = 1) = \mu$, and believe that y_{x_i}, y_{x_j} are ex ante independent. Each group $i = 1, 2$ can observe the realization of a binary signal $s_i \sim \sigma(y_{x_i})$ dependent on the valence y_{x_i} if they exert effort $e_i \in \{0, 1\}$ at a cost $c > 0$. In that case they can communicate (x_i, m_i) to the policymaker, where $m_i \subset \{s_i\}$ is a verifiable message. The policymaker observes the messages and chooses to implement either one of the groups' policies or a status quo policy with valence $q > \mu$. The groups $i \in \{1, 2\}$ care about the policy position if one of their policies is implemented, and receive a payoff of $1 - (x - \hat{x}_i)^2$ in that case, where $\hat{x}_i$ is their ideal policy; if P keeps the status quo, their payoff is 0. The policymaker's payoff is the valence of the policy she implements.

Before choosing their policies the groups can decide to form a coalition. If they do, they are forced to choose the same policy. To model the choice of policy I assume that they follow this bargaining protocol: a group is chosen uniformly at random to propose a common policy, and can make a take-it-or-leave-it offer to the other group. If the recipient declines the offer, they choose policies, efforts and messages independently. If a coalition is formed, the proposer decides to exert effort or not, and then communicates the signal realization (if any) to the follower, who chooses her own effort level, and communicates the signal realization (if any) back to the proposer. They can then send verifiable messages $m_i \subset \{s_i, s_j\}$ to the policymaker, who then either implements the policy proposed by the coalition or keeps the status quo.

Formally, $\sigma : \{0,1\} \to \Delta(\{0,1\})$ is a signal, and the timing of interaction is as follows:

0. Nature draws
   - $y_x \in \{0,1\}$ with $\Pr(y_x = 1) = \mu$ for each $x \in \mathbb{R}$ independently,[1]
   - $i \in \{0,1\}$ uniformly at random, the proposer.
1. Group i decides whether to ask $j \neq i$ to join a coalition, in which case she proposes $x_i \in \mathbb{R}$.
2. If group i asks sender j, j observes x_i, and decides whether to accept or not.
3. If there is a coalition (i.e., i proposes and j accepts).
   - Group i chooses effort $e_i \in \{0,1\}$, observes a signal realization $s_i \sim \sigma(y_{x_c})$ if $e_i = 1$ and $s_i = 0$ if $e_i = 0$.
   - Group j observes s_i, chooses $e_j \in \{0,1\}$, and observes a signal realization $s_j \sim \sigma(y_{x_c})$ if $e_j = 1$ and $s_j = 0$ if $e_j = 0$.
   - Group i chooses $m \subset \{s_1, s_2\}$ or not to lobby.

   If there isn't a coalition.
   - Groups $i = 1, 2$ choose policies $x_i \in \mathbb{R}$ and efforts $e_i \in \{0,1\}$ simultaneously.
   - Groups $i = 1, 2$ observe signal realizations $s_i \sim \sigma(y_{x_i})$ if $e_i = 1$ and $s_i = 0$ if $e_i = 0$, and choose $m_i \subset \{s_i\}$ or not to lobby.
4. P observes whether a coalition was formed, and observes (x_i, m_i) if group i lobbies, for each $i = 1, 2$. Then P chooses $a \in \{0,1\}$.

Payoffs are $u_i = a(1 + v_i(x)) - ce_i$ and $u_P = a(y_x - q)$, where $v_i(x) = -(x - \hat{x}_i)^2$, $\hat{x}_1 = -h/2$, $\hat{x}_2 = h/2$ with $h, c > 0$, and $q > \mu$. I assume that if P is indifferent between two proposals and is willing to implement them, she chooses one uniformly at random. I also assume that there is an infinitesimally small access cost, so, if indifferent, the groups choose not to lobby. The equilibrium concept is PBE in pure strategies.

Discussion of the model.—I take the model of policymaking with policy-specific valence from Hirsch and Shotts (2012), who assume preferences of the form $y_x - \lambda(x - \hat{x})$, where λ is a loss function. See the discussion in that paper for an interpretation of these assumptions. I depart from these preferences by assuming that the groups do not care about valence and the policymaker only cares about valence. The first assumption simplifies the calculations but does not change the results qualitatively [in a next iteration I will just remove this assumption]. The second assumption is

[1] An alternative which would capture the notion of partially-transferrable valence could be to take y_x to be an Ornstein-Uhlenbeck process without drift. Note that a Brownian process is not desirable, since it requires that the valence of at least one policy is common knowledge, which would either break the symmetry between the groups, or introduce an artificial bias for or against compromise.

consequential, and I need to hold it in order to abstract from asymmetries between the groups—if the policymaker cares about the position of the policy, this creates a bias either in favor of one of the groups or in favor of compromise, which obscures the effect of the groups' ideological diversity on their coalitional strategies, the main focus of the paper. I'll study this extension in an appendix. A substantive interpretation of this assumption can be grounded in the descriptive study by Baumgartner et al. (2009): we can view the groups as members of the same "side" in a policy debate, and their positional space as an indifference curve of a pivotal legislator.

The core assumptions are (1) that there are two dimensions of conflict: one is the dimension needed to model the idea of ideological diversity, and the other one models the conflict between the groups and policymaker, which creates an incentive for collusion (this is expressed by the fact that the groups don't internalize the value of the q); and (2) that a coalition creates the possibility of information collusion. The fact that valence is non-transferrable is important for the results, since relaxing it even a little, by admitting a correlation between y_{x_1} and y_{x_2} that decreases with $|x_1 - x_2|$, alters the analysis qualitatively. I'll pursue this in an appendix. However, the main message of the paper still holds broadly speaking.

Assumption 1. $\min\{\Pr(s_1 = 1)\Pr(s_1 = 0), \Pr(s_1 = s_2 = 1)\} \geqslant c$, where $s_1, s_2 \sim \sigma(y_0)$ are independent.

Some notation.—Let $s_1, s_2 \sim \sigma(y_x)$ be independent, and define

$$
\begin{aligned}
\mu_1 &:= \Pr(y_x = 1 | s_1 = 1),\\
\mu_{11} &:= \Pr(y_x = 1 | s_1 = s_2 = 1),\\
\mu_{\geqslant 1} &:= \Pr(y_x = 1 | s_1 + s_2 \geqslant 1),\\
p &:= \Pr(s_i = 1),\\
p_{11} &:= \Pr(s_i = s_j = 1),\\
p_{10} &:= \Pr(s_i = 1, s_j = 0),\\
p_{\geqslant 1} &:= \Pr(s_i + s_j \geqslant 1),\\
p_{1|0} &:= \Pr(s_i = 1 | s_j = 0), \text{ and}\\
p_{1|1} &:= \Pr(s_i = 1 | s_j = 1).
\end{aligned}
$$

We have $\mu_{\geqslant 1} < \mu_1 < \mu_{11}$ and $p_{11} < p < p_{\geqslant 1}$.

II. Results

A. *The no-coalition subgame*

If there isn't a coalition, the groups choose policies $x_1, x_2 \in \mathbb{R}$ simultaneously and effort $e_1, e_2 \in \{0,1\}$. If $e_i = 1$, i observes $s_i \sim \sigma(y_{x_i})$ and decides whether to send (x_i, m_i) with $m_i \in [0, s_i]$ or not. The decisions depend on how much evidence the policymaker needs to be convinced to abandon the status quo.

If $q > \mu_{11}$ then even with two positive signals the groups cannot convince the policymaker, and hence they don't lobby. If $\mu_{11} \geqslant q > \mu_1$, then they need two positive signals to induce the policymaker to accept any policy change. Thus it's only worth lobbying if they coordinate on the same policy, i.e., they choose $x := x_1 = x_2$. Given x, the equilibrium condition for $e_1 = e_2 = 1$ is that $\Pr(s_1 = s_2 = 1)(1 + v_i(x)) - c \geqslant 0$ for both $i = 1, 2$. There is a policy x that satisfies both inequalities iff

$$h \leqslant \tilde{h}_3 := 2\sqrt{1 - \frac{c}{\Pr(s_1 = s_2 = 1)}}.$$

(Note that the square root is well-defined because of Assumption 1.) If $h < h_3$ then there are multiple equilibria—the groups can coordinate on any policy position x in the interval $\left[-\frac{h_3 - h}{2}, \frac{h_3 - h}{2}\right]$. I will assume that the groups choose $x = 0$ in this case.

Assumption 2. If $\mu_{11} \geqslant q > \mu_1$ and $h < h_3$ then the groups choose $x_1 = x_2 = 0$ in equilibrium.

This could be due to $x = 0$ being a focal point or because it maximizes the aggregate welfare of the groups.

If $\mu_1 \geqslant q > \mu$ then the groups can convince the policymaker to implement their preferred policy independently. Given that the policy choice and effort decisions are simultaneous, the groups choose their preferred policy, $x_i = \hat{x}_i$, if they expect to lobby with positive probability. The equilibrium condition for $e_1 = e_2 = 1$ is thus

$$\Pr(s_i = 1 \vee s_j = 1) + \Pr(s_j = 1)\left(\frac{1}{2}\Pr(s_i = 1) + \Pr(s_i = 0)\right) v_i(\hat{x}_j) - c \geqslant \Pr(s_j = 1)(1 + v_i(\hat{x}_j))$$

for $i = 1, 2$, so it is an equilibrium iff $\frac{1}{2}p^2h^2 + p(1-p) - c \geqslant 0$, which is true by Assumption 1. If $e_j = 0$ then group i strictly prefers to choose $e_i = 1$, since $\Pr(s_i = 1) - c \geqslant 0$, so the only equilibrium is this $e_1 = e_2 = 1$.

To summarize, we have the following. See Figure 1.

Proposition 1. *If there is no coalitional lobbying, then*

- *if $q > \mu_{11}$ or $\mu_{11} \geqslant q > \mu_1$ and $h \geqslant \tilde{h}_3$ then there is no lobbying,*
- *if $\mu_{11} \geqslant q > \mu_1$ and $h \leqslant \tilde{h}_3$, the groups coordinate to lobby for $x = 0$, and both exert effort,*
- *if $\mu_1 \geqslant q > \mu$, the groups lobby for their preferred policy, and both exert effort.*

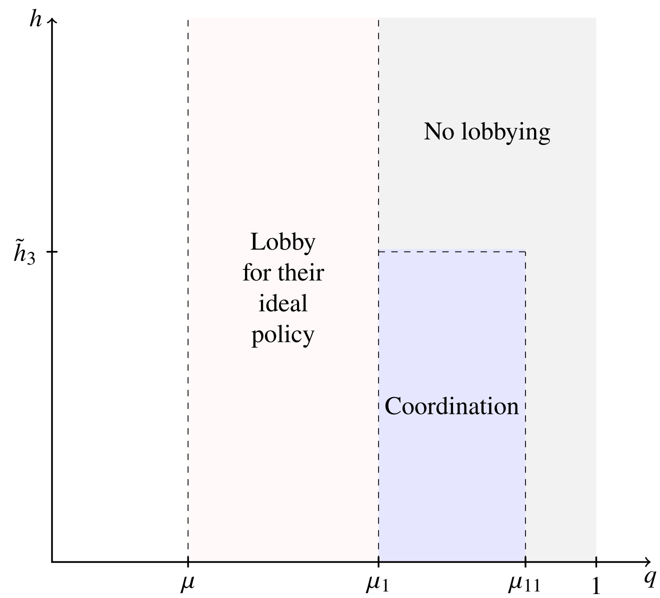


Figure 1: Equilibria in the no-coalition subgame, with $\mu = .25$, $\mu_0 = .1$, $\mu_1 = .6$, $c = .1$.

B. *Coalitional lobbying*

Suppose that group i has the option to propose group j to form a coalition. She can propose a policy x_i and a strategy profile to be played in the coalition subgame, as long as it satisfies the equilibrium conditions. In that case I will say that the strategy is *incentive compatible*. Group j accepts iff her expected payoff under group i's proposal is weakly greater than her expected payoff $\underline{u}_j$ in the no-coalition subgame (which she obtains if she rejects the proposal). I will say that i's proposal is *individually rational* for j if this is the case. In order for i to be willing to make the proposal, her own expected payoff has to be weakly greater than her expected payoff $\underline{u}_i$ in the no-coalition subgame. Therefore i's proposal has to be individually rational for i as well.

As in the no-coalition subgame, the set of strategies available to the groups depends on how much evidence the policymaker needs to be convinced to approve the policy proposed by the groups. If $q > \mu_{11}$, again the groups cannot convince the policymaker that the policy is good quality, so they don't lobby. If $\mu_{11} \geqslant q > \mu_1$, they need two positive signals to induce the policymaker to accept the proposal. Given x_i, e_i and s_i, group j can only have a reason to exert effort if $s_i = 1$, which implies $e_i = 1$, since, if i didn't find positive evidence about the quality of the policy, j's effort cannot make a difference in convincing the policymaker. Hence the groups can use the following strategy: $e_i = 1$, and $e_j = \mathbb{1}(s_i = 1)$. In other words, the leader exerts effort, and the follower exerts effort iff the proposer obtained a positive signal. Alternatively, they can choose $e_i = e_j = 0$ and never lobby. Therefore, if the leader i decides to propose j to form a coalition, she chooses

$x_i \in \mathbb{R}$ to solve the following problem:

$$\begin{aligned}
\text{maximize}\quad & \Pr(s_i = s_j = 1)(1 + v_i(x_i)) - c \\
\text{subject to}\quad & \Pr(s_i = s_j = 1)(1 + v_i(x_i)) - c \geqslant 0, && (\mathrm{IC}_i) \\
& \Pr(s_j = 1 | s_i = 1)(1 + v_j(x_i)) - c \geqslant 0, && (\mathrm{IC}_j) \\
& \Pr(s_i = s_j = 1)(1 + v_i(x_i)) - c \geqslant \underline{u}_i, && (\mathrm{IR}_i) \\
& \Pr(s_i = s_j = 1)(1 + v_j(x_i)) - \Pr(s_i = 1)c \geqslant \underline{u}_j. && (\mathrm{IR}_j)
\end{aligned}$$

We calculated the expected payoffs in the no-coalition subgame in the previous section under Assumption 2 for $i = 1, 2$ we have

$$\underline{u}_i = \begin{cases} \Pr(s_i = s_j = 1)(1 + v_i(0)) - c, & \text{if } h \leqslant \tilde{h}_3, \\ 0, & \text{otherwise.} \end{cases}$$

The groups have two reasons to form a coalition. They reduce the aggregate expected cost of collecting information, since group j doesn't waste effort if group i doesn't find favorable evidence for the policy. This, in turn, gives the proposer an opportunity to extract a greater policy concession from the follower, which, in turn, gives her a greater incentive to work on gathering information relative to her incentive. I call this equilibrium *pooling resources*, since the groups form a coalition in order to combine their knowledge. We have the following result (see the Appendix for the proofs).

Proposition 2. *If $\mu_{11} \geqslant q > \mu_1$ and Assumptions 1 and 2 holds, there are numbers $\hat{h}_3$ and $\overline{h}_3$ such that $0 < \hat{h}_3 \leqslant \tilde{h}_3 < \overline{h}_3$ and*

- *if $h \leqslant \overline{h}_3$ then the groups pool resources,*
- *if $h > \overline{h}_3$ then they do not lobby.*

If $h \leqslant \hat{h}_3$ then the group who proposes the coalition chooses her ideal policy, and if $\hat{h}_3 < h \leqslant \overline{h}_3$ then the policy proposed becomes increasingly moderate as h increases.

The result shows that the groups form a coalition if their heterogeneity is small enough that coordination is the equilibrium in the no-coalition subgame, i.e., if $h \leqslant \tilde{h}_3$. It also shows that the groups form a coalition if $\tilde{h}_3 \leqslant h \leqslant \overline{h}_3$, a case in which the groups would not lobby if a coalition was not possible. In this region the policymaker is better off, since she has more information than in the no-coalition case. Thus coalition lobbying is Pareto improving in this case.

As Figure 2 illustrates, when heterogeneity is low, $h \leqslant \hat{h}_3$, the group who proposes the coalition chooses her ideal policy $\hat{x}_i$. The reason is that neither the incentive compatibility nor the individual rationality constraints bind for small h. When h is small, the proposer's ideal policy is sufficiently attractive for the follower, who is then willing to exert effort. Moreover, the outside option, which

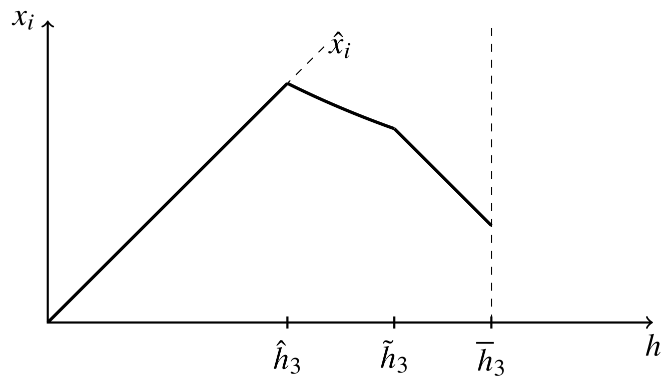


Figure 2: Equilibrium x_i with $\mu = .25$, $\mu_0 = .1, \mu_1 = .6$, $c = .1$, $\mu_{11} \geqslant q > \mu_1$, and $\hat{x}_i = \frac{h}{2}$.

is to coordinate on lobbying separately for a common neutral policy, is not more attractive, since the expected cost is greater (the follower has to pay the cost of gathering information for sure, while, in the coalition, she only has to pay for it if the proposer finds favorable evidence) and the policy position is not much more attractive (as long as h is small). When $h > \hat{h}_3$, however, the last assertion is no longer true, and the proposer has to moderate the policy proposal in order to motivate the follower to accept forming a coalition. When $h > \tilde{h}_3$, the incentive compatibility constraint binds, and the proposer has to further moderate in order to motivate the follower not only to accept but to exert effort. These two effects imply that the policy proposed by the coalition becomes more moderate as h grows. When $h > \overline{h}_3$, the proposer has to moderate so much that her own incentive compatibility constraint cannot be satisfied—there is no common ground for the groups to work together. Hence, the groups do not lobby.

Suppose now that $\mu_1 \geqslant q > \mu_{\geqslant 1}$, i.e., that the groups can convince the policymaker by showing only one piece of favorable evidence, but communicating that they have at least one piece of favorable evidence among the two groups is not sufficient. What are the strategies available to the groups? Pooling resources is available, but the groups can do better if only the proposer exerts effort, since the probability of success is $\Pr(s_i = 1)$, strictly greater than the probability of success if they both invest, $\Pr(s_i = s_j = 1)$, and the cost they pay is smaller. I will call the latter strategy a *moderating coalition*, since the groups form a coalition in order to curb competition by compromising on a moderate policy. They do not produce more information for their proposal as in the pooling resources strategy, and in fact by agreeing not to compete they reduce the amount of information they collectively produce and communicate. We have the following result.

Proposition 3. *If* $\mu_1 \geqslant q > \mu_{\geqslant 1}$ *and* $p_{11} < p(1-p)$ *then there are numbers* $\tilde{h}_2$, $\overline{h}_2$ *and* $\overline{c} > 0$ *such that* $0 < \tilde{h}_2 < \overline{h}_2$ *and if* $c < \overline{c}$ *we have*

- *if* $h \leqslant \tilde{h}_2$ *then each group lobbies for their ideal policy,*
- *if* $\tilde{h}_2 \leqslant h \leqslant \overline{h}_2$ *then a coalition is formed and only the proposer exerts effort, and*

- *if* $\overline{h}_2 \leqslant h$ *then a coalition is formed and the groups do not lobby.*

The coalition induces moderation, but if $h \in [\tilde{h}_2, \overline{h}_2]$ *then the policy proposed becomes less moderate as* h *increases.*

The moderating coalition strategy is only an equilibrium if the level of heterogeneity is large enough and not too large. When heterogeneity is too low the follower cannot commit not to collect information if the proposer fails for any policy that is worth pursuing for the proposer, and thus the policymaker does not interpret a positive piece of evidence as coming from only one source. In that case the policymaker's posterior belief is $\mu_{\geqslant 1}$ rather than μ_1, and therefore she does not implement the proposal, since we are assuming that $\mu_{\geqslant 1} < q$. When heterogeneity is extremely large there is no compromise policy that is better than pursuing their ideal policy. In that case the groups form a coalition in order to commit not to lobby. The assumptions that $p_{11} < p(1-p)$ and c is small enough are needed for tractability. When $p_{11} > p(1-p)$ there is a small interval $[h', \tilde{h}_2)$ in which the groups pool resources.

Figure 3 shows the policy proposed by i when she is selected as the coalition proposer. We see that when the level of heterogeneity is such that the groups form a moderating coalition, i.e., $h \in [\tilde{h}_2, \overline{h}_2]$, the groups moderate the proposal. In equilibrium the follower does not exert effort, and therefore the proposer does not have to moderate in order to provide incentives. The reason for moderation is that she has to match the expected payoff that the follower obtains if she decides to reject the proposal and instead lobby alone. As h increases, the outside option becomes less attractive to the follower, and thus the proposer can extract more favorable policy concession, which leads to more extreme policies in equilibrium.

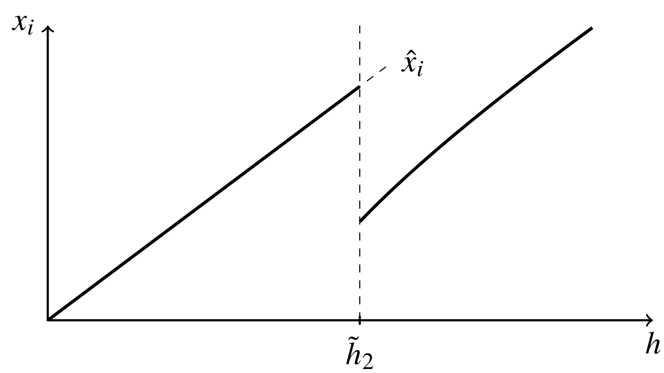


Figure 3: Equilibrium x_i with $\mu = .25$, $\mu_0 = .1$, $\mu_1 = .6$, $c = .1$, $\mu_1 \geqslant q > \mu_{\geqslant 1}$, and $\hat{x}_i = \frac{h}{2}$.

Finally, suppose that $\mu_{\geqslant 1} \geqslant q > \mu$, i.e., the groups can convince the policymaker by showing only one piece of favorable evidence, regardless of who produced it. In this case a new strategy is available when a group proposes to form a coalition. The proposer group can search for evidence, and if she does not find favorable evidence, the follower group can search. If any group finds

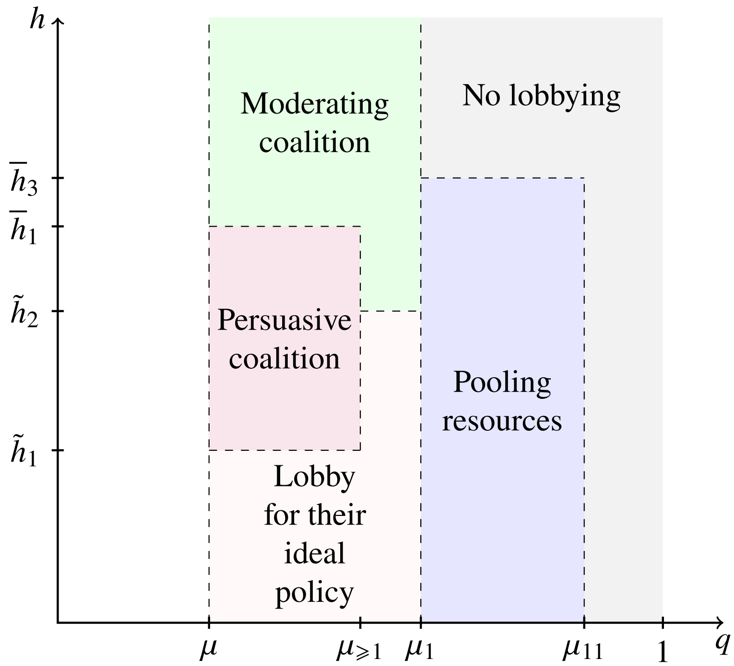


Figure 4: Equilibria with $\mu = .25$, $\mu_0 = .1$, $\mu_1 = .6$, $c = .1$.

favorable evidence, they can communicate it to the policymaker, who implements the proposal. The ex ante probability of success is $\Pr(s_1 + s_2 \geqslant 1)$, which is greater than the probability that any group can achieve by lobbying independently, i.e., $\Pr(s_i = 1)$. I call this strategy a *persuasive coalition*, since the groups join forces in order to increase their chances of convincing the policymaker of implementing their proposal, but they achieve this outcome not by sending more information (as in the pooling resources strategy) but by sending *less* information than they could send independently. I interpret the fact that the groups can convince the policymaker with higher probability while communicating less information as indication that the groups are more persuasive when they lobby together than if they lobbied separately. Formally, we have the following result. See Figure 4.

Proposition 4. *If $\mu_{\geqslant 1} \geqslant q > \mu$, $p_{11} < p(1-p)$ and $p < 2 - \sqrt{2}$ there are numbers $\tilde{h}_1$, $\overline{h}_1$ and $\overline{c} > 0$ such that $0 < \tilde{h}_1 < \tilde{h}_2 < \overline{h}_1 < \overline{h}_2$ and if $c < \overline{c}$ we have*

- *if $h \leqslant \tilde{h}_1$ then each group lobbies for their ideal policy,*
- *if $\tilde{h}_1 \leqslant h \leqslant \overline{h}_1$ then a persuasive coalition is formed,*
- *if $\overline{h}_1 \leqslant h \leqslant \overline{h}_2$ then a moderating coalition is formed, and*
- *if $\overline{h}_2 \leqslant h$ then the groups form a coalition and do not lobby.*

If $h \in (\tilde{h}_1, \tilde{h}_2)$ the policy becomes increasingly extreme as h grows, but if $h \in (\tilde{h}_2, \overline{h}_1)$ the opposite happens.

The Proposition shows that the persuasive coalition is an equilibrium if and only if the level of heterogeneity is intermediate. There are two reasons for this result. First, if heterogeneity is too low then the groups prefer the outcome they achieve when they lobby for their ideal policy, since that strategy creates a higher chance that any of the two proposals is implemented, and both proposals are attractive when h is low. Second, persuasion requires the proposer to compromise on a policy that induces both the proposer and the follower to exert effort. When h increases, the set of such policies shrinks until it becomes empty. At that point the proposer can still propose a moderating coalition, since in that case the policy has to be sufficiently attractive in order to be incentive compatible only for her. Therefore for large h the groups engage in a moderating coalition. For extremely large h the groups form a coalition but don't lobby, as in the previous case.

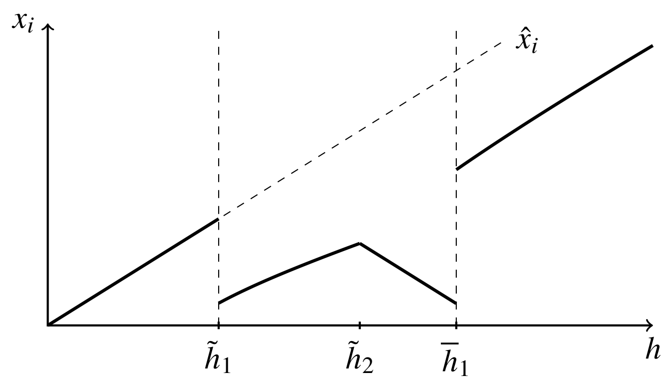


Figure 5: Equilibrium x_i with $\mu = .25$, $\mu_0 = .1$, $\mu_1 = .6$, $c = .1$, $\mu_{\geqslant 1} \geqslant q > \mu$, and $\hat{x}_i = \frac{h}{2}$.

Figure 5 shows the equilibrium policy proposed by group i. When $h < \tilde{h}_1$ or $h > \overline{h}_1$ the equilibrium is the same as in the previous case (Figure 3). When $h \in (\tilde{h}_1, \overline{h}_1)$, the groups use the persuasive coalition strategy. As we see in the Figure, a persuasive coalition requires more moderation than the moderating coalition. The reason is that the former requires both groups to be motivated to exert effort. We thus see that there is a trade-off between being more persuasive as a coalition and having to moderate on the policy proposal. Moreover, it is noteworthy that heterogeneity has a non-monotonic effect on the policy proposed. For $h < \tilde{h}_2$ the individual rationality constraint of the follower group binds. As h increases, the outside option of the follower, i.e., to lobby alone, becomes less attractive, and hence she is willing to accept a more extreme proposal. However, when $h > \tilde{h}_2$ the incentive compatibility constraint binds. Given that the cost of effort does not depend on h, but the ideal policy of the follower, $\hat{x}_j$, becomes increasingly extreme, the follower demands a larger policy concession from the proposer in order to be willing to gather information. This force moderates the equilibrium proposal, and thus x_i becomes more moderate as h increases. When $h = \overline{h}_1$, the level of moderation that the follower requires is so large that the proposer prefers to work alone, even though it entails a decrease in the probability that the proposal will be accepted, and thus a persuasive coalition is no longer an equilibrium.

III. Extensions

A. *Policymaker Cares about the Policy Position*

Suppose that $u_P = a(y_{x_i} - q - \alpha(x_i - \hat{x}_P)^2)$ with $\alpha > 0$ small and $\hat{x}_P$ random with density $f > 0$ symmetric and single-peaked at 0, with $f(0)$ small enough. In the no-coalition subgame, the groups moderate, and choose $x_1 = -x, x_2 = x$ with

$$x = \frac{1}{1 + \frac{p}{2-p} f(0) h} \frac{h}{2}.$$

Except for this, the game is exactly the same. Thus, the effect of adding a policymaker with preferences over policies is that there is less competition in the no-coalition subgame. This, in turn, raises the value of lobbying independently for small h.

B. *Different Divisions of the Bargaining Surplus*

Forming a coalition to lobby for a policy x offers the groups expected payoffs $u(x) = \mathbb{E}(u_1(x), u_2(x))$ assuming they play the equilibrium of the coalition subgame. Each group can exit and obtain the expected payoff in the no-coalition subgame, $\underline{u} = (\underline{u}_1, \underline{u}_2)$. Let $U = \text{co}\{u(x) : x \in \mathbb{R}, u(x) \geqslant \underline{x}\}$ be the convex hull of the set of payoffs attainable in a coalition. Any efficient bargaining protocol will deliver a point in the Pareto frontier of U. In the model I characterize the points of this set that maximize one dimension, which correspond to "take it or leave it" offers. More general bargaining protocols will potentially deliver more compromise. Notice, however, that even an equal division of the surplus will not necessarily deliver perfect compromise ($x = 0$), because it's possible that $u(0) \notin U$. This is because of the "incentive compatibility" constraints, i.e., the fact that x needs to provide incentives for the groups to take the right action in order to deliver aggregate gains relative to the no-coalition outcome.

C. *Correlation in Valence*

If valence is correlated for similar policies (i.e., policies with close positions), then the incentive to compete when h is small disappears, but it can reappear for h above some threshold, and then disappear again. If the correlation of valence decays fast as policies become more dissimilar, this is its only effect, and the analysis follows through.

D. *Endogenous Information*

In this extension I allow the groups to publicly design the information they gather, and then disclose a verifiable report. Using Kamenica and Gentzkow (2011) we can think of information as a distribution of posteriors $\sigma \in \Delta([0,1])$ whose mean is the prior, i.e., such that $\int p\, d\sigma(p) = \mu$. We can think of the verifiable disclosure requirement as a requirement that a message $m \in [0,1]$ has to satisfy $m \leqslant p$, where p is the realization of σ. Given the arguments in Gentzkow and Kamenica (2017a) we know that in equilibrium we can assume that there is full revelation.

In the competition subgame, if the group j chooses policy x_j and signal σ_j, group $i \neq j$ chooses x_i and $\sigma_i \in \Delta([0,1])$ to maximize

$$p_j^* + \int_{[q,1]} \left(1 - p_j^* + \sigma_j([q,p))u_i(x_i) + \sigma_j(\{p\})\frac{u_i(x_i) + u_i(x_j)}{2} + \sigma_j((p,1])u_i(x_j)\right) d\sigma_i(p)$$

where $p_j^* = \sigma_j([q,1])$ subject to

$$\int p\, d\sigma_i(p) = \mu.$$

First, it's clear that $x_i = \hat{x}_i$. By standard results in convex optimization (Luenberger, 1968) there is $\lambda \geqslant 0$ such that if σ_i is a best response then it maximizes

$$\int_{[q,1]} \left(1 - p_j^* - \left(\frac{1}{2}\sigma_j(\{p\}) + \sigma_j((p,1])\right)h^2 - \lambda p\right) d\sigma_i(p).$$

Notice that if $p < 1$ and $\sigma_j(\{p\}) > 0$ then $\sigma_i(\{p\}) = 0$, because i can move mass to $p + \epsilon$ with $\epsilon > 0$ arbitrarily small and with $\sigma_j(\{p\}) = 0$. By the arguments in Boleslavsky and Cotton (2018) we obtain that $\sigma_j(\{p\}) = 0$ for $0 < p < 1$, so $\sigma_j([0,p])h^2 = \lambda p + K$ for some constant K if $p \in \operatorname{supp} \sigma_i$. This means that σ_j must be uniform on $[\underline{p}, \overline{p})$ for some $\overline{p} \leqslant 1$. We obtain that in equilibrium $\sigma_i = \sigma_j$ have an atom at 0, have constant density at $[q, \overline{p}]$, and may have an atom at 1. We can easily establish the following result.

Proposition III.1. *If* $0 \leqslant h^2 \leqslant \frac{(1-q)(1+q-2\mu)}{2\mu}$ *then the equilibrium signals are*

$$\sigma = (1 - p^*)\delta_0 + p^*\mathcal{U}[q, \overline{p}]$$

with

$$p^* = \frac{(1+h^2)\mu + q - \sqrt{(1+h^2)^2\mu^2 - 2\mu q + q^2}}{q(2+h^2)},$$
$$\overline{p} = \mu(1+h^2) + \sqrt{(1+h^2)^2\mu^2 - 2\mu q + q^2}.$$

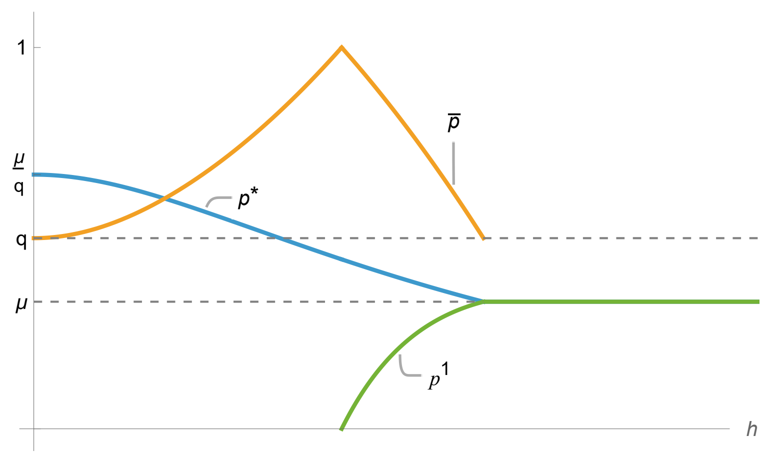
If $\frac{(1-q)(1+q-2\mu)}{2\mu} \leqslant h^2 \leqslant \frac{2(1-q)(1-\mu)}{(2-q)\mu}$ *then the equilibrium signals are*

$$\sigma = (1 - p^*)\delta_0 + (p^* - p^1)\mathcal{U}[q, \overline{p}] + p^1\delta_1,$$

where

$$
\begin{aligned}
p^* &= \frac{(1+h^2)\mu + q - \sqrt{(1+h^2)^2\mu^2 - 2\mu q + q^2}}{q(2+h^2)},\\
\overline{p} &= 2 - \mu(1+h^2) - \sqrt{(1+h^2)^2\mu^2 - 2\mu q + q^2},\\
p^1 &= \frac{\mu - \frac{1}{2}(q+\overline{p})p^*}{1 - \frac{1}{2}(q+\overline{p})}.
\end{aligned}
$$

If $h^2 \geqslant \frac{2(1-q)(1-\mu)}{(2-q)\mu}$ *then the signals are* $\sigma = (1-\mu)\delta_0 + \mu\delta_1$.



If the groups form a coalition they can use the optimal signal $\sigma^{\mathrm{BP}} = (1-\frac{\mu}{q})\delta_0 + \frac{\mu}{q}\delta_q$. This requires that both groups accept to send the message $m = q$, i.e., $1+u_i(x), 1+u_j(x) \geqslant 0$. Therefore, if group i can propose, they choose x to maximize $u_i(x)$ subject to the "incentive compatibility" constraint $1+u_j(x) \geqslant 0$ and the "individual rationality" constraint $\frac{\mu}{q}(1+u_j(x)) \geqslant \underline{u}_j = p^*(2-p^*)(1-\frac{1}{2}h^2)$, where $\underline{u}_j$ is the payoff in the competition subgame, and p^* is the equilibrium probability that each group obtains a signal realization $p \geqslant q$. The group i decides to pursue a coalitional strategy if $\frac{\mu}{q}(1+u_j(x^*)) \geqslant \underline{u}_i$, where x^* is the solution to the problem (if it exists).

The "individual rationality" constraints are stronger than the "incentive compatibility" constraints iff $p^*(2-p^*)(1-\frac{1}{2}h^2) \geqslant 0$, i.e., iff $h \leqslant \sqrt{2}$. In that case they are feasible iff

$$\frac{h^2}{4} \leqslant 1 - \frac{q}{\mu}p^*(2-p^*)\left(1 - \frac{h^2}{2}\right).$$

This holds iff $h \geqslant h^*$ for some $h^* \in (0, \sqrt{2})$ [PROVE]. If $h < h^*$ then in equilibrium the coalition doesn't form. If $h > h^*$ the coalition forms with

$$x^* = -\frac{h}{2} + \sqrt{1 - \frac{q}{\mu}p^*(2-p^*)\left(1 - \frac{h^2}{2}\right)}.$$

We have to verify that $x^* \leqslant \frac{h}{2}$, because if $x^* > \frac{h}{2}$ then the proposer can choose their ideal policy [PROVE THIS].

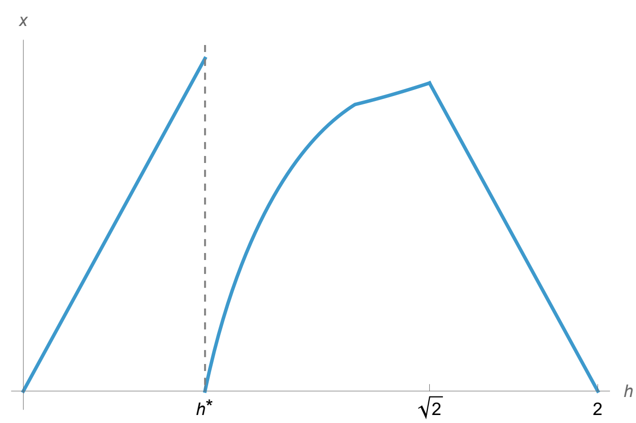
If $h \geqslant \sqrt{2}$ then the "incentive compatibility" constraints bind, and they are feasible iff $h \leqslant 2$. In that case $x^* = -\frac{h}{2} + 1$.

Proposition III.2. *There is $h^* \in (0, \sqrt{2})$ such that*

– *if $0 < h \leqslant h^*$ then the coalition doesn't form, and the groups compete to implement their ideal policies,*
– *if $h^* \leqslant h \leqslant 2$ then the coalition forms, with equilibrium policy*

$$x^* = \begin{cases} -\frac{h}{2} + \sqrt{1 - \frac{q}{\mu} p^* (2 - p^*) \left(1 - \frac{h^2}{2}\right)} & \text{if } h^* \leqslant h \leqslant \sqrt{2}, \\ -\frac{h}{2} + 1 & \text{if } \sqrt{2} \leqslant h \leqslant 2, \end{cases}$$

– *if $h \geqslant 2$ then the coalition forms but the groups do not lobby.*



With endogenous information the coalition is always "persuasive," and we obtain the same non-monotonic pattern. We have that $\frac{dh^*}{dq} > 0$ [PROVE IT], so the coalition becomes less likely to form as q grows. The overall conclusion is similar to what I found in the baseline model, except that the coalition never benefits the policymaker.

E. *Complementary vs. Substitutable Information*

In conversation, Hye Young You made the comment that a coalition allows the groups to provide less information than if they lobby separately if the pieces of evidence they can provide are substitutes. Suppose that there is a change in an environmental regulation that business as a whole favors. The regulator is willing to implement it if it is good for at least one of two industries and not too bad for the other one. In that case if the two industries can gather information about how effective the policy is on their industry, they are better off filtering their disclosures in order not to contradict each other. In this case the pieces of evidence they can provide are substitutes.

But in other cases the evidence provided by two sources may be complementary. In my model this arises mechanically if the bar that the evidence needs to pass is large relative to how much evidence each group can provide alone. But this doesn't capture the reasonable idea that when forming a coalition the groups provide information about *different aspects* of the policy they advocate.

Suppose that there is a two-dimensional state, $\omega \in \{0,1\}^2$, with independent priors $\Pr(\omega_1 = 1) = \Pr(\omega_2 = 1) = \mu$. The policymaker takes action $a \in \{0,1\}$ with payoff $a(\frac{\omega_1+\omega_2}{2} - q)$ with $\mu < q \leqslant 1$. Each group $i \in \{1,2\}$ can gather verifiable information about ω_i. Then if $q \leqslant \frac{1+\mu}{2}$ then each group i can convince the policymaker to take action by themselves if they provide enough evidence that $\omega_i = 1$. If one of them can design an experiment alone, they can induce $a = 1$ with probability $\frac{\mu}{2q-\mu}$ (this is the standard Bayesian persuasion result). If they work together they can induce $a = 1$ with probability $\frac{\mu}{q}$ if $q \leqslant \frac{1}{2-\mu}$ and $\frac{\mu^2}{2q-1}$ if $q > \frac{1}{2-\mu}$, which is greater. (To do this, if $q \leqslant \frac{1}{2-\mu}$ send a binary signal σ such that if $\omega \neq 0$ then $\sigma = 1$ and if $\omega = 0$ then $\sigma = 1$ with probability p, where p solves $\frac{\mu}{\mu+(\mu+p(1-\mu))(1-\mu)} = q$. If $q > \frac{1}{2-\mu}$ send a binary signal σ such that if $\omega = (1,1)$ then $\sigma = 1$, if $\omega = (0,0)$ then $\sigma = 0$, and otherwise send $\sigma = 1$ with probability p, where p solves $\Pr(\sigma = 1) = \frac{\mu^2}{2q-1}$. To prove the upper bound, note that if P is a random variable on $\Delta(\{0,1\}^2)$ with $\mathrm{E}P = \mu_0$ then $\Pr(P(1,1) + \frac{1}{2}P(1,0) + \frac{1}{2}P(0,1) \geqslant q) \leqslant \frac{\mu}{q}$ and

$$\begin{aligned}\Pr\Big(P(1,1) + \frac{1}{2}P(1,0) + \frac{1}{2}P(0,1) \geqslant q\Big) &= \Pr\Big(P(1,1) + \frac{1}{2}(1 - P(1,1) - P(0,0)) \geqslant q\Big) \\ \leqslant \Pr\Big(P(1,1) + \frac{1}{2}(1 - P(1,1)) \geqslant q\Big) &= \Pr(P(1,1) \geqslant 2q-1) \leqslant \frac{\mathrm{E}[P(1,1)]}{2q-1} = \frac{\mu^2}{2q-1},\end{aligned}$$

both by Markov's inequality.)

Something interesting is that when $q \leqslant \frac{1+\mu}{2}$ these two experiments (the one run by a group alone, and the one run by both groups) are not Blackwell-comparable (i.e., neither is more informative than the other one), and they both leave the policymaker with zero expected payoff. When they form a coalition the groups provide "different kinds of information" (i.e., the message they send provides information about both dimensions of the state) and they are more likely to be successful, but they don't provide more information, nor lead to the implementation of better-quality policies on average.

Now, suppose that the policymaker takes action $a \in \{0,1\}$ with payoff $a(\sqrt{\omega_1\omega_2} - q)$ with $\mu^2 < q \leqslant \mu$. Each group can convince the policymaker to take action by themselves with probability μ^2/q by sending a binary signal that induces the distribution of posteriors $(1-\mu^2/q)\delta_0 + \mu^2/q\delta_{q/\mu}$. If the groups send a common message, they choose a random variable P with support on $\Delta\{0,1\}^2$ such that $\mathrm{E}P = \mu_0$, where μ_0 is the prior of ω, to maximize $\Pr(P(1,1) \geqslant q)$. Now, the marginal $P(1,1)$ is such that $\mathrm{E}P(1,1) = \mu^2$, so $\Pr(P(1,1) \geqslant q) \leqslant \mu^2/q$ by Markov's inequality. Sending information about just one dimension achieves this bound, so transmitting information jointly doesn't benefit the groups. If $\mu < q \leqslant 1$ then the groups need to collaborate, and in that case they also implement the policy with probability μ^2/q. (For $q \leqslant \frac{\mu}{2-\mu}$ they can send $\sigma = 1$ if $\omega \neq 0$ or $\omega = 0$ with probability p, and send $\sigma = 0$ otherwise; for $q > \frac{\mu}{2-\mu}$ they can send $\sigma = 1$ if $\omega = (1,1)$ or $\omega \in \{(0,1),(1,0)\}$ with probability p, and otherwise $\sigma = 0$.)

In general, suppose that the "production function" of valence is a power mean $\left(\frac{\omega_1^\rho+\omega_2^\rho}{2}\right)^{\frac{1}{\rho}}$ with $\rho \in (0,1]$, which is $\sqrt{\omega_1\omega_2}$ when $\rho \to 0$ and $\frac{\omega_1+\omega_2}{2}$ when $\rho = 1$.

If a group provides information about ω_i alone, she succeeds if she induces a posterior p such that $(1-p)\mu 2^{-\frac{1}{\rho}} + p[(1-\mu)2^{-\frac{1}{\rho}} + \mu] \geqslant q$, i.e.,

$$p \geqslant \underline{p} \equiv \frac{q - \lambda\mu}{\lambda + (1-2\lambda)\mu},$$

where $\lambda = 2^{-\frac{1}{\rho}}$, which goes from q/μ to $2q-\mu$. I need to require that $\mu < \underline{p}$, i.e., $q > (2\lambda + (1-2\lambda)\mu)\mu$, because otherwise it's enough not to send any information. So a group alone succeeds with probability $\mu/\underline{p}$ if $q \leqslant \lambda + (1-\lambda)\mu$, and can't succeed otherwise.

If the groups form a coalition, they implement the policy if they induce a posterior p such that $p(1,1) + \lambda(p(1,0) + p(0,1)) \geqslant q$. We have the Markov bounds

$$\Pr(a=1) \leqslant \min\left\{\frac{\mu^2 + 2\lambda\mu(1-\mu)}{q}, \frac{(1-\lambda)\mu^2}{q-\lambda}\right\}.$$

The first bound is stronger iff $q \leqslant \frac{\mu+2\lambda(1-\mu)}{2-\mu}$. We can achieve it by sending, if $q \leqslant \frac{\mu+2\lambda(1-\mu)}{2-\mu}$, $\sigma = 1$ if $\omega \neq 0$ or $\omega = 0$ with probability p, and $\sigma = 0$ otherwise. And if $q > \frac{\mu+2\lambda(1-\mu)}{2-\mu}$, $\sigma = 1$ if $\omega = (1,1)$ or $\omega \in \{(0,1),(1,0)\}$ with probability p, and otherwise $\sigma = 0$.

There are two reasons to form a coalition: to enjoy the greater capacity to persuade, and to decrease competition. What's interesting is that when the information each group has act as complements for the policymaker, then forming a coalition doesn't increase persuasiveness when q is intermediate.

There is another sense in which the information each group has is a complement or a substitute for the information that the other group has, which is how correlated their signals are. In the paper I consider the case of perfect correlation; here I have considered the case of no correlation.

In general, define $\mu_0 \in \Delta\Omega$ by $\mu_0(1,1) \in [0,\mu]$ and $\mu_0(1,0) = \mu_0(0,1) = \mu - \mu_0(1,1)$, so $\Pr(\omega_1 = 1) = \Pr(\omega_2 = 1) = \mu$, but ω_1 and ω_2 may be arbitrarily correlated. The case $\mu_0(1,1) = \mu^2$ corresponds to each dimension being independent, so each group's information complements the other group's information in some sense; the case $\mu_0(1,1) = \mu$ corresponds to the two dimensions being equal, so each group can perfectly substitute for the other group's information. In this sense, the magnitude of $\mu_0(1,1) \in [\mu^2, \mu]$ is a measure of how substitutable each group's information is.

If P is a random variable on $\Delta\Omega$ with $\mathrm{E}P = \mu_0$ we have

$$\begin{aligned}\Pr(P(1,1) + \lambda(P(1,0) + P(0,1)) \geqslant q) &\leqslant \frac{\mathrm{E}[P(1,1) + \lambda(P(1,0) + P(0,1))]}{q} \\ &= \frac{\mu_0(1,1) + \lambda(\mu_0(1,0) + \mu_0(0,1))}{q}\end{aligned}$$

and

$$\begin{aligned}\Pr(P(1,1) + \lambda(P(1,0) + P(0,1)) \geqslant q) &\leqslant \Pr((1-\lambda)P(1,1) \geqslant q - \lambda) \\ &\leqslant \frac{\mathrm{E}[(1-\lambda)P(1,1)]}{q-\lambda} = \frac{(1-\lambda)\mu_0(1,1)}{q-\lambda},\end{aligned}$$

so

$$\Pr(a = 1) \leqslant \min\left\{\frac{\mu_0(1,1) + \lambda(\mu_0(1,0) + \mu_0(0,1))}{q}, \frac{(1-\lambda)\mu_0(1,1)}{q-\lambda}\right\}.$$

Consider sending $\sigma = 1$ if $\omega \neq 0$ or if $\omega = 0$ with probability p. Then

$$\Pr(\sigma = 1) = \Pr(\sigma = 1|\omega \neq 0)\Pr(\omega \neq 0) + \Pr(\sigma = 1|\omega \neq 0)\Pr(\omega \neq 0) = 1 - (1-p)\mu_0(0,0),$$

so if $\beta \in \Delta\Omega$ is the posterior belief about ω given $\sigma = 1$, then $\beta(1,1) = \frac{\mu_0(1,1)}{\Pr(\sigma=1)}$ and $\beta(1,0) = \beta(0,1) = \frac{\mu_0(1,0)}{\Pr(\sigma=1)}$. Therefore $\beta(1,1)+\lambda(\beta(1,0)+\beta(0,1)) = q$ iff $\Pr(\sigma = 1) = \frac{\mu_0(1,1)+\lambda(\mu_0(1,0)+\mu_0(0,1))}{q}$. So this signal achieves the first bound, but it works iff

$$\mu_0(1,1) + \lambda(\mu_0(1,0) + \mu_0(0,1)) \leqslant q \leqslant \frac{\mu_0(1,1) + \lambda(\mu_0(1,0) + \mu_0(0,1))}{1 - \mu_0(0,0)}.$$

Consider sending $\sigma = 1$ if $\omega = (1,1)$ or if $\omega \in \{(1,0),(0,1)\}$ with probability p. Then

$$\Pr(\sigma = 1) = \mu_0(1,1) + p(\mu_0(1,0) + \mu_0(0,1)),$$

so if $\beta \in \Delta\Omega$ is the posterior belief about ω given $\sigma = 1$, then $\beta(1,1) = \frac{\mu_0(1,1)}{\Pr(\sigma=1)}$ and $\beta(1,0) = \beta(0,1) = \frac{p\mu_0(1,0)}{\Pr(\sigma=1)}$. Therefore $\beta(1,1) + \lambda(\beta(1,0) + \beta(0,1)) = q$ iff $\beta(1,1) + \lambda(1 - \beta(1,1)) = q$, i.e., iff $\Pr(\sigma = 1) = \frac{(1-\lambda)\mu_0(1,1)}{q-\lambda}$. So this signal achieves the second bound, and it works iff

$$\frac{\mu_0(1,1) + \lambda(\mu_0(1,0) + \mu_0(0,1))}{1 - \mu_0(0,0)} \leqslant q \leqslant 1.$$

If group 1 lobbies alone, they can induce a posterior p that $\omega_1 = 1$. In that case, the posteriors over ω are $\beta(1,1) = \frac{\mu_0(1,1)}{\mu_0(1,1)+\mu_0(1,0)}p$, $\beta(1,0) = \frac{\mu_0(1,0)}{\mu_0(1,1)+\mu_0(1,0)}p$, $\beta(0,1) = \frac{\mu_0(0,1)}{\mu_0(0,1)+\mu_0(0,0)}(1-p)$. Therefore, $a = 1$ iff $\beta(1,1) + \lambda(\beta(1,0) + \beta(0,1)) \geqslant q$, i.e.,

$$\frac{\mu_0(1,1) + \lambda\mu_0(1,0)}{\mu}p + \frac{\lambda\mu_0(0,1)}{1-\mu}(1-p) \geqslant q,$$

which is

$$p \geqslant \underline{p} = \frac{\mu[(1-\mu)q - \lambda\mu_0(1,0)]}{(1-\mu)\mu_0(1,1) + (1-2\mu)\lambda\mu_0(1,0)}.$$

So they can implement policy iff $\underline{p} \leqslant 1$, i.e., $q \leqslant \frac{\mu_0(1,1)+\lambda\mu_0(1,0)}{\mu}$. In that case, they implement with probability

$$\frac{(1-\mu)\mu_0(1,1) + (1-2\mu)\lambda\mu_0(1,0)}{(1-\mu)q - \lambda\mu_0(1,0)}.$$

When $\lambda = 0$, i.e., the dimensions of valence are perfect complements, we have that lobbies can implement policy alone with probability $\frac{\mu_0(1,1)}{q}$ for $q \leqslant \frac{\mu_0(1,1)}{\mu}$, and together they do it with probability $\frac{\mu_0(1,1)}{q}$. Thus, with perfect complementarity the coalition doesn't make a difference if q is intermediate, which contradicts the intuition that complementarity should make the coalition more valuable for either the groups or the policymaker.

If $\underline{p} \leqslant 1$ and the groups don't form a coalition, they can lobby for their ideal policy, and competition pushes them to provide more information than if the other group stays inactive. The analysis in the previous section applies, and we obtain the following result. If $0 \leqslant h^2 \leqslant \frac{(1-\underline{p})(1+\underline{p}-2\mu)}{2\mu}$ then the equilibrium signals are

$$\sigma = (1-p^*)\delta_0 + p^*\mathcal{U}[\underline{p}, \overline{p}]$$

with

$$p^* = \frac{(1+h^2)\mu + \underline{p} - \sqrt{(1+h^2)^2\mu^2 - 2\mu\underline{p} + \underline{p}^2}}{\underline{p}(2+h^2)},$$
$$\overline{p} = \mu(1+h^2) + \sqrt{(1+h^2)^2\mu^2 - 2\mu\underline{p} + \underline{p}^2}.$$

If $\frac{(1-\underline{p})(1+\underline{p}-2\mu)}{2\mu} \leqslant h^2 \leqslant \frac{2(1-\underline{p})(1-\mu)}{(2-\underline{p})\mu}$ then the equilibrium signals are

$$\sigma = (1-p^*)\delta_0 + (p^* - p^1)\mathcal{U}[\underline{p}, \overline{p}] + p^1\delta_1,$$

where

$$p^* = \frac{(1+h^2)\mu + \underline{p} - \sqrt{(1+h^2)^2\mu^2 - 2\mu\underline{p} + \underline{p}^2}}{\underline{p}(2+h^2)},$$
$$\overline{p} = 2 - \mu(1+h^2) - \sqrt{(1+h^2)^2\mu^2 - 2\mu\underline{p} + \underline{p}^2},$$
$$p^1 = \frac{\mu - \frac{1}{2}(\underline{p} + \overline{p})p^*}{1 - \frac{1}{2}(\underline{p} + \overline{p})}.$$

If $h^2 \geqslant \frac{2(1-\underline{p})(1-\mu)}{(2-\underline{p})\mu}$ then the signals are $\sigma = (1-\mu)\delta_0 + \mu\delta_1$.

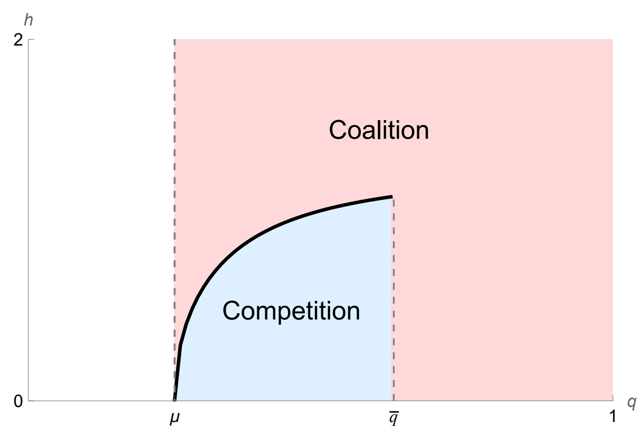
When the groups are more diverse they are forced to provide more information if they decide to compete. As before, the groups compete iff

$$p^*(2-p^*)\left(1-\frac{h^2}{2}\right) \geqslant p^C\left(1-\frac{h^2}{4}\right),$$

where

$$p^C = \min\left\{\frac{\mu_0(1,1)+\lambda(\mu_0(1,0)+\mu_0(0,1))}{q}, \frac{(1-\lambda)\mu_0(1,1)}{q-\lambda}\right\}$$

is the probability that the coalition succeeds. As h increases competition becomes less attractive for two reasons: it forces the groups to provide more information, which reduces their probability of success, and it creates more policy risk, which the coalition reduced by creating a compromise. Therefore, there is $h^* \geqslant 0$ such that the groups compete iff $h < h^*$, as the following figure illustrates.



As before, groups compete when neither h nor q are not too large, and they form a coalition if h is not too large (i.e., there is a mutually beneficial compromise). In other words, groups compete when they are not too diverse, their information is not too complementary, and the valence of the status quo is not too large.

Notice that when the groups lobby together they choose the information they provide to the policymaker to make them indifferent between adopting their policy proposal and keeping the status quo. In other words, in this model coalitions never improve welfare. In contrast, when the groups compete they are forced to provide more information than strictly necessary to induce adoption. Whether the expertise the groups possess is complementary or substitutable doesn't change this conclusion.

Complementarity makes it harder for the groups to persuade the policymaker alone (i.e., it raises the bar $\underline{p}$). Therefore, it induces groups to form a coalition. But it doesn't induce the coalition to provide more information in equilibrium. The coalition provides information about both aspects of the policy, viz., the aspect that each group has an expertise on. It provides information about *more* *aspects* of the policy than the groups if they lobby alone, but it doesn't provide *more* information. This conclusion is relevant for empirical work that seeks to measure how much information groups provide: messages about more topics may not provide more information, and, therefore, a good measure of "quantity" of information must be able to distinguish quantity from the number of topics. The number of verifiable statements in a message is, other things being equal, a better measure of information in this context than the number of topics or entities the message contains. This model predicts that, under competition, individual lobbyists' messages are in some sense "narrow" but "deep," while the messages sent by coalitions are "broad" but "shallow."

Notice that if there is an opposition on the other "side" of the issue (e.g., groups defending the status quo) that can also use verifiable information to lobby for their side, then the coalition will be forced to produce more information. However, if, in equilibrium, the groups on this side compete, they will be forced to provide even more information than if they form a coalition. The only force in this model that leads to the production of information is competition.

IV. Discussion

A. *Alternative Theories*

Exogenous Benefits and Costs.—Advocates trade off "costs of coordination" for being more effective (Hojnacki, 1997). There is a coalition and an advocate decides whether to join it or not, $z \in \{0, 1\}$. If she joins, the probability of the proposal passing is π_1 and otherwise $\pi_0 < \pi_1$. The cost is $c(h) \geqslant 0$, which we can assume is an increasing function of heterogeneity h. So, she joins iff $\pi_1 V - c(h) \geqslant \pi_0 V$, i.e.,

$$c(h) \leqslant (\pi_1 - \pi_0)V,$$

where $V > 0$ is the net value of the proposal.

So, assuming h, c, $\pi_1 - \pi_0$ and V are independent, we should expect

(1) high-diversity coalitions being formed less often than low-diversity coalitions (although this depends on the distribution of h—if h is 99% of the time large, and everything else is independent, we should observe more coalitions with high h than low h),
(2) coalitions being more effective than separate advocates ($\pi_1 > \pi_0$),
(3) z and $h|z = 1$ being positively correlated with V, i.e., more and more diverse coalitions when the policy is more "salient" to advocates,
(4) z and $h|z = 1$ being positively correlated with $\pi_1 - \pi_0$, i.e., more and more diverse coalitions when the coalition should be more effective (when there is more opposition, when a "pivotal" group is in the coalition).

If h, c, $\pi_1 - \pi_0$ and V can be correlated, of course, these conclusions could no longer hold. For example, if $c(h)$ is either 0 or too large, and $\mathbb{E}(\pi_0 | c(h) > V) > \mathbb{E}(\pi_1 | c(h) = 0)$, then we will see coalitions being less effective than separate advocates.

Presumably we will see policy compromise when advocates join a coalition, and this compromise should increase with h. A way to formalize this idea is as follows: the policy proposal can be characterized by $x \in \mathbb{R}$. The coalition and the advocate have ideal points 0 and $h \geqslant 0$, respectively. Their payoffs are $u_C = a(V_C - |x|)$ and $u_A = a(V_A - |x - h|) - c(h)z$, respectively, where $a \in \{0, 1\}$ is whether the proposal is implemented or not. Assume that the probability of implementation is independent of x. If the advocates lobby separately, their expected payoffs are $\mathbb{E}u_C(z = 0) = \pi_0(V_C - ph)$ and $\mathbb{E}u_A(z = 0) = \pi_0(V_A - (1 - p)h)$, where $p \in (0, 1)$ is the probability that group A's policy is implemented if $a = 1$. If the advocates lobby together, they choose a policy $x \in [0, h]$ and their expected payoffs are $\mathbb{E}u_C(z = 1) = \pi_1(V_C - x)$ and $\mathbb{E}u_A(z = 1) = \pi_1(V_A - (h - x)) - c(h)$.

There are gains from forming a coalition if $\pi_1(V_C - x) \geqslant \pi_0(V_C - ph)$ and $\pi_1(V_A - (h - x)) - c(h) \geqslant \pi_0(V_A - (1 - p)h)$, i.e., iff

$$\left(1 - \frac{\pi_0}{\pi_1}(1 - p)\right) h - \left(1 - \frac{\pi_0}{\pi_1}\right) V_A + \frac{c(h)}{\pi_1} \leqslant x \leqslant \left(1 - \frac{\pi_0}{\pi_1}\right) V_C + \frac{\pi_0}{\pi_1} ph,$$

which is feasible iff

$$h + \frac{c(h)}{\pi_1 - \pi_0} \leqslant V_A + V_C.$$

The empirical implications are the same.

Joining the Attack.—Holyoke (2011) starts with a story about the Independent Insurance Agents of America reluctantly accepting to join a coalition led by the American Bankers Association and the Financial Services Roundtable that led to the Gramm-Leach-Bliley Act of 1999, which ended Glass-Steagall barriers for banks and securities investment firms to sell insurance products in their offices. The story can be formalized as follows.

There is a defender of the status quo (D) and an attacker (A). Congress either keeps the status quo ($a = 0$) or implements a new regulation ($a = 1$). The new regulation is characterized by a policy parameter $x \in \mathbb{R}$. Congress doesn't care about x per se. The defender can either defend the status quo or form a coalition with the attacker. If the defender doesn't join the attack, the attacker sends a proposal x to Congress, who implements it with probability π_0. If the defender forms a coalition with the attacker, they can bargain over the proposal x, and Congress approves it with probability $\pi_1 > \pi_0$. The idea is that, by joining the coalition, the defender increases the probability of a reform, which hurts her, but can have a say on the details of the new regulation.

The defender's payoff is $u_D = a(-V_D - |x - h|)$ and the attacker's payoff is $u_A = a(V_A - |x|)$, where $V_D, V_A > 0$ are the loss and the benefit from the reform for the defender and the attacker, respectively, and $h > 0$ measures the divergence in the preferences over the details of the policy. The ideal policy for the attacker is $x = 0$ and the ideal policy for the defender is $x = h$.

Under what conditions will both the attacker and the defender be better off by forming a coalition? If they form a coalition, the defender doesn't challenge the attacker's proposal, and they can bargain over a compromise policy $x \in [0, h]$. The defender agrees iff $\pi_1(-V_D - (h - x)) \geqslant \pi_0(-V_D - h)$, i.e., iff $x \geqslant \frac{\pi_1 - \pi_0}{\pi_1}(V_D + h)$. The attacker agrees iff $\pi_1(V_A - x) \geqslant \pi_0 V_A$, i.e., iff $x \leqslant \frac{\pi_1 - \pi_0}{\pi_1} V_A$. So, a coalition is Pareto improving iff

$$\frac{\pi_1 - \pi_0}{\pi_0} V_D \leqslant h \leqslant V_A - V_D.$$

Therefore diversity in the preferences on the details has to be big enough, otherwise the attacker doesn't have anything to offer to the defender, but can't be too large, because the bigger the disagreement, the more the attacker has to compensate the defender in order to motivate her not to counteract the attack. Also, $V_A \geqslant \frac{\pi_1}{\pi_0} V_D$, i.e., the attacker has to care more about the reform itself (relative to the details) than the defender. If the defender is very strong, i.e., $\frac{\pi_1}{\pi_0}$ is large, then she doesn't have an incentive to compromise. Thus the conditions for a coalition are: (1) the defender is relatively weak, (2) the defender cares more about the details of the reform than the attacker, and (3) their disagreement about the details of the policy is intermediate.

If a coalition is possible, i.e., $V_D + h \leqslant V_A$ and $h \geqslant \frac{\pi_1 - \pi_0}{\pi_0} V_D$, how much will they compromise? In order to make predictions, we need to model the bargaining protocol. Consider a take-it-or-leave-it protocol in which the defender has probability p of being the proposer (this is a measure of her bargaining power). If she is the proposer, she chooses x to leave the attacker indifferent between accepting to join a coalition or not, i.e., $x = \frac{\pi_1 - \pi_0}{\pi_1} V_A$. If the attacker proposes, she chooses x to leave the defender indifferent, i.e., $x = \frac{\pi_1 - \pi_0}{\pi_1}(V_D + h)$. On average, the proposal is

$$x = \left(1 - \frac{\pi_0}{\pi_1}\right)(pV_A + (1 - p)(V_D + h)).$$

The level of compromise increases in the strength of the defender (measured by $\frac{\pi_1}{\pi_0}$), the level of heterogeneity h, how much they care about the reform relative to the details (V_A and V_D) and, naturally, the bargaining power of the defender p.

The Signaling Theory.—Phinney (2017) tells the story of the ACLU and Catholic charities forming a coalition against the conservative welfare reform of 1995. They share objectives, they have private information about the quality of the reform, and they dislike each other, so forming a coalition is costly. Thus by forming a coalition they signal that the reform is low quality. The story can be formalized as follows.

Two interest groups, $i = 1, 2$, know the realization of $q \sim U[0, 1]$, the "badness" of a policy reform, which they oppose. If they both agree, by paying a cost $c(h) > 0$ they can form a coalition. The cost is increasing in the level of heterogeneity h. Congress (P) observes whether they form a coalition ($z \in \{0,1\}$), and chooses whether to implement the reform ($a \in \{0,1\}$). Payoffs are $u_i = -aq - c(h)x$ and $u_P = a(b-q)$, where $b > \frac{1}{2}$ is the perceived benefit of the policy according to Congress (ignoring the "badness"). (If $b < \frac{1}{2}$ the groups don't need to advocate.)

In the interesting equilibrium the groups form a coalition iff $q \geqslant q_0$, and Congress stops the reform ($a = 0$) iff they form a coalition. The conditions are that $q_0 = c(h)$ and

$$2b - 1 \leqslant c(h) \leqslant \min\{2b, 1\}.$$

In words, heterogeneity has to be intermediate (large enough so that the coalition is a credible signal, but no so large that it's not worth forming it), and the perceived benefit of the policy for Congress cannot be too large (otherwise the groups are powerless).

The question is why the groups can't do something else to signal their information about q. They could send a signal using expenditures or protests (i.e., "burning money"), or they could send verifiable information. Forming a coalition constitutes a binary signal, so it doesn't transmit a lot of information, and thus it's not clear why it would be preferred over the alternatives. Either the alternatives are not available, or the coalition must be doing something else than just sending a binary signal.

We can create a version of the theory in which the coalition induces policy compromise, and that compromise creates the cost that makes the signal credible. We need a "single-crossing condition," so assume that policy x has quality y_x, and both the groups and the policymaker care about y_x. The groups also care about x. The policymaker doesn't care about x (for the policymaker x is just a means to an end), but cares about costs q that the advocates don't internalize. So $u_i = a(y_x - (x - \hat{x}_i)^2)$ and $u_P = a(y_x - q)$. Assume that the advocates have private information about y_x. They are more willing to compromise on x (i.e., incur a policy loss) the greater $\mathbb{E}_i(y_x)$ is, so they can use the coalition as a signal. We can formalize this idea as follows:

0. Nature chooses $\mu \sim U[\underline{\mu}, \overline{\mu}]$ and $y_x \in \{0,1\}$ with $\Pr(y_x = 1) = \mu$ independently for each $x \in \mathbb{R}$.
1. Advocates $1,2$ observe μ and choose whether to form a coalition or not, policies $x_1, x_2 \in \mathbb{R}$ (which are the same if they form a coalition), and they can send a verifiable signal $s_i \in \{0,1\}$ such that $\Pr(s_i = y_{x_i} | y_{x_i}) = p > \frac{1}{\sqrt{2}}$.
2. The policymaker observes their proposals and information and chooses $a \in \{0,1\}$ and $x \in \mathbb{R}$.

In the interesting equilibrium we have $\frac{\underline{\mu}+\overline{\mu}}{2} < q$, so the groups have to advocate, and there is a $\mu_0 \in (\underline{\mu}, \overline{\mu})$ such that the groups form a coalition iff $\mu \geqslant \mu_0$. Suppose that $\frac{\mu_0+\overline{\mu}}{2} \geqslant q$, so the groups don't need to send a signal if they form a coalition, and $\Pr(y_x = 1 | s = 1, \mu \leqslant \mu_0) \geqslant q$, so if they lobby alone they convince the policymaker to implement a proposal they send favorable evidence. Suppose $\hat{x}_1 = -\frac{h}{2}$, $\hat{x}_2 = \frac{h}{2}$ and they choose $x = 0$ if they form a coalition, and $x_i = \hat{x}_i$ if they lobby separately. If they lobby separately, their expected payoff is, assuming that if $s_1 = s_2 = 1$ then the policymaker picks a proposal uniformly at random,

$$\mathbb{E}u_i(z=0) = \left[\left(1 - \frac{h^2}{2}\right)p\mu - \frac{h^2}{2}(1-p)(1-\mu)\right](2 - p\mu - (1-p)(1-\mu)).$$

If they lobby together, their expected payoff is $\mathbb{E}u_i(z=1) = \mu - \frac{h^2}{4}$. The equilibrium condition is that $\mathbb{E}u_i(z=1) \geqslant \mathbb{E}u_i(z=0)$ iff $\mu \geqslant \mu_0$. Let $f(\mu) = \mathbb{E}u_i(z=1) - \mathbb{E}u_i(z=0)$. We have $f(0) = -\frac{h^2}{2}(p^2 - \frac{1}{2}) < 0$, and $f(1) = 1 - p(2-p) + \frac{h^2}{2}(p(2-p) - \frac{1}{2}) > 0$. Also, $f(\mu)$ is a quadratic, so it must have exactly one root μ_0 in $(0,1)$, and $f(\mu) > 0$ iff $\mu > \mu_0$. Therefore indeed the advocates prefer a coalition iff $\mu \geqslant \mu_0$. Finally, μ_0 has to satisfy that $\underline{\mu} < \mu_0 < \overline{\mu}$, $\frac{\mu_0 + \overline{\mu}}{2} \geqslant q$ and

$$\frac{p}{1-p}\frac{\frac{1}{2}(\underline{\mu} + \mu_0)}{1 - \frac{1}{2}(\underline{\mu} + \mu_0)} \geqslant \frac{q}{1-q}.$$

We can prove easily that $\frac{d\mu_0}{dh} < 0$ and μ_0 goes from $\frac{p^2+p-1}{p(2p-1)}$ when $h = 0$ to $\frac{p - \frac{1}{\sqrt{2}}}{2p-1}$ when $h \to \infty$. These conditions require that both q and h should be intermediate.

So, indeed, policy compromise induced by the coalition can serve as a signal about the quality of the reform. The problem highlighted above still remains: why can't the groups use policy compromise directly to signal their private information? In fact, they could send a more informative signal by doing this, and they don't need a coalition for that. The coalition could be used to curb the incentive to free-ride, but the prediction of that model would be that groups will always form a coalition.

Another problem for the signaling theory is that there is always policy compromise on average, whether the groups want it or not. The reason is that if they lobby separately, each presenting their ideal policy, the policymaker will choose one, and the advocates presumably don't know exactly which one (otherwise they are in fact compromising), so on average there will be compromise. The coalition merely reduces the uncertainty. One needs to assume an *expressive benefit* of advocacy (i.e., the group benefits just by advocating for her ideal policy, regardless of actual policy choice). This is a reasonable assumption: organizations are agents of their members or donors, who could very well have expressive motivations to support the advocacy effort. However, the previous critique applies: organizations don't need to form a coalition to use policy compromise as a signal. They could just change their position.

Contrast with this Paper.—My story is about efficiency in information collection when the groups face a strong competition from the other side (q large) and information *suppression* when the groups face weak competition (q low). The empirical implication is that one should observe homogeneous coalitions forming when q is large, and relatively heterogeneous coalitions forming when q is small. And non-monotonic patterns in the level of policy compromise as a function of h that depend on q.

There is not an unambiguous empirical test that can adjudicate between these alternative mechanisms. But the theories have distinctive empirical implications. The benefits-vs-costs story (under extra assumptions) predicts a monotonic pattern: the harder to convince the policymaker, the more likely that a diverse coalition is formed. My theory predicts a different pattern: we should see more heterogeneous coalitions when competition is low. Also, the benefits-vs-costs story predicts a monotonic pattern in policy compromise under a coalition: more diverse coalitions should compromise more. My story predicts non-monotonic patterns. The signaling theory and the join-the-attack story predict that coalitions are only formed if they are moderately heterogeneous, and only when the policymaker is not too hard to convince. This also contrasts with my story.

B. *Empirical Cases*

U.S. Climate Action Partnership.—The USCAP illustrates how two very distinct interests, namely, businesses and environmental organizations, formed a coalition to develop and advocate for a common policy to mitigate climate change. The USCAP was formed in 2006 by major major corporations (BP, General Electric, DuPont, Alcoa, Caterpillar) and environmental organizations (Environmental Defense Fund, Natural Resources Defense Council, World Resources Institute). The coalition developed the 2009 USCAP Blueprint for Legislative Action, outlining an economy-wide cap-and-trade policy as well as standards regulating coal combustion, transportation, and energy efficiency in buildings. The policy represented a significant compromise with permissive carbon offsets, free allowances and weaker emissions targets than environmental groups would have pursued independently. The Blueprint served as a model for the Waxman–Markey bill (American Clean Energy and Security Act of 2009), which passed in the House but failed in the Senate.

Even though we cannot observe the information that these businesses and environmental groups would have provided had they advocated for separate policies, we can speculate that they would have been held to a higher standard of proof. Businesses would have been required to provide more evidence that low emissions targets and specific exemptions were consistent with the legislators' climate objectives, and environmental groups would have been required to provide more evidence that the market mechanism they would have proposed would work as the intended. It is likely that, even though more information would have been brought to legislators, they would have not been persuaded to submit any of the two proposals for a vote.

Coalition for Safe Affordable Food (CSAF).—Industry group set up by the Grocery Manufacturers Association (representing large food and beverage companies), the Biotechnology Industry Organization, and CropLife America (the trade association for agrochemical producers). The coalition flooded Congress with warnings about the cost and confusion of a state-by-state labeling "patchwork" after Vermont enacted a law in 2014 that would require mandatory GMO labels on food products. CSAF supported the Safe and Accurate Food Labeling Act of 2015 that blocked state mandatory labels and instituted voluntary disclosure, but it failed in the Senate. Some food producers including Campbell announced that they would comply with Vermont's law (soon to take effect) by labeling genetically engineered ingredients nationally. This decision undermined the case that national labeling would create enormous economic costs, and suggests a divergence in interests between food producers and biotech plus agrochemical producers. The former were more interested in harmonization of standards, while the latter were more interested in preventing labeling standards that would suggest that GMOs are unsafe for consumers. In 2016 the coalition backed Public Law 114-216, which was quickly enacted, and included a federal preemption clause (thereby stopping Vermont's law) and required very flexible labeling.

This case illustrates that coalitions can fail to aggregate information after converging on a common policy position. The Safe and Accurate Food Labeling Act of 2015 failed in the Senate despite intense lobbying efforts, which included a commissioned study by Cornell University professor William Lesser claiming that a mandate could cost New York families an average of $500 per year.[2] However, after the bill failed in the Senate, the actions by food producers suggested that national labeling was not prohibitively costly.

Comments to the EPA.—Choi (2024) studies comments submitted to the EPA during its regulatory review of the Greenhouse Gas Emissions Standards under the Clean Air Act. She finds that several comments are submitted by coalitions of environmental groups and businesses. Consistent with this paper's model, the comments submitted by partnerships involve policy compromise on the following dimension. Businesses tend to emphasize technology limitations for emissions reductions in addition to their R&D efforts. Environmental organizations, in contrast, emphasize the need to reduce emissions. Coalitions lie in the middle. Choi (2024) finds that coalitions' comments refer to more entities such as quantities and specific locations than comments sent by either businesses or environmental groups alone. She interprets this as coalitions producing higher-quality information when advocating for their compromise position. My model, and in particular the extension in Subsection E, suggests that the fact that coalitions talk about more entities does not imply that they are providing higher-quality information. Measuring the value of information communicated by lobbyists (through Congressional hearings or comments to regulators) remains an open problem to the best of my knowledge, although there has been progress (Ban et al., 2024).

[2] https://web.archive.org/web/20151211145749/http://publications.dyson.cornell.edu/docs/LabelingNY.pdf

V. Conclusion

This paper examines when and why interest groups form tactical coalitions for informational lobbying. I develop a model in which interest groups can choose to advocate independently or form a coalition to jointly develop and support a policy proposal. The model generates predictions that rationalize several empirical findings in the lobbying literature:

- Coalitions are not unconditionally more effective than competitive lobbying (Mahoney and Baumgartner, 2004) due to a selection effect, viz., that they tend to form when the other "side" of the issue is relatively strong.
- Coalitions tend to be more effective than competitive lobbying when ideological diversity among coalition members is moderate to high (Junk, 2019; Dwidar, 2022a) as this enables better strategic information management.
- Coalitions are more likely to form when the opposing side or status quo policy position is strong (Hojnacki, 1997), as this creates incentives for resource pooling.

However, the mechanism I identify differs substantially from existing theories, with important normative implications for democratic governance.

First, while existing accounts typically assume that coalitions aggregate information, my analysis reveals that coalitions sometimes strategically reduce the information provided to policymakers. When policy advocates face moderate interest divergence and weak opposition, coalitions function as information filters that coordinate message strategies to withhold unfavorable evidence. This suggests that the common assumption that diverse coalitions automatically lead to more informed policymaking requires reconsideration.

Second, a result of the analysis is that policy compromise can be associated with low information provision rather than consensus. The reason is that the most aggressive form of information management requires effort by every member of the coalition, which in turn requires more policy compromise as a form of compensation. This challenges the intuitive view that compromise positions (or the formation of the coalition itself) signal policy quality.

Third, an implication of the analysis is that diverse coalitions can be more effective at influencing policy than more homogeneous ones, as the empirical literature finds, but for reasons different from mechanisms like costly signaling. In the model developed here, diverse coalitions tend to form when opposition to the policy change is weak. This occurs because, when groups are not very diverse and face weak opposition, they prefer competing to persuade the policymaker to implement their most preferred policies rather than compromising within a coalition. Specifically, when ideological disagreement is small, the risk of losing in competition is not large, and allowing the other group to pursue its preferred strategy increases the overall probability that their side succeeds. Conversely, when opposition is strong, persuading the policymaker becomes infeasible for individual groups, forcing them toward coalition formation regardless of diversity. This pattern suggests that diverse coalitions are more likely to emerge when persuasion is relatively easy, with coalitions forming precisely to exploit the policymaker's limited bargaining leverage. Thus, diverse coalitions may be more successful not because they produce higher quality policy recommendations, but because they strategically form under conditions where policymakers are already more susceptible to influence, potentially resulting in the implementation of policies with lower average quality.

Beyond lobbying, this framework applies to other domains where advocates with partially aligned interests can try to persuade a decision maker to implement a project they design if they provide enough evidence of its value. Different divisions in a company may face the choice of advocating for competing investment plans or a compromise. Research units seeking grants may choose to compete with different proposals or to collaborate on a common project. In international organizations such as the United Nations Framework Convention on Climate Change, countries with overlapping interests (e.g., developing countries and small island states) may either advocate independently for their ideal demands (e.g., climate finance vs. loss and damage funds) or coordinate on joint proposals. In each of these contexts, the strategic tension between policy compromise and information revelation identified in this paper can help explain when and why coalitions emerge, and whether they improve or potentially reduce the quality of decision-making.

Appendix

A. *Proof of Proposition 2*

By symmetry, I will assume without loss of generality that $\hat{x}_i = h/2$ and $\hat{x}_j = -h/2$, where i is the proposer group and j is the other group.

No-coalition payoffs.—If $\mu_{11} \geqslant q > \mu_1$ we have $\underline{u}_i = \underline{u}_j = \max\{p_{11}(1 - \frac{1}{4}h^2) - c, 0\}$.

Equilibrium.—If group i proposes a coalition, she chooses x_i to

$$\begin{aligned}
\text{maximize}\quad & \Pr(s_i = s_j = 1)(1 + v_i(x_i)) - c \\
\text{subject to}\quad & \Pr(s_i = s_j = 1)(1 + v_i(x_i)) - c \geqslant 0, && (\mathrm{IC}_i) \\
& \Pr(s_j = 1 | s_i = 1)(1 + v_j(x_i)) - c \geqslant 0, && (\mathrm{IC}_j) \\
& \Pr(s_i = s_j = 1)(1 + v_i(x_i)) - c \geqslant \underline{u}_i, && (\mathrm{IR}_i) \\
& \Pr(s_i = s_j = 1)(1 + v_j(x_i)) - \Pr(s_i = 1)c \geqslant \underline{u}_j. && (\mathrm{IR}_j)
\end{aligned}$$

We can re-write this problem as follows:

$$\begin{aligned}
\text{maximize}\quad & -(x_i - h/2)^2 \\
\text{subject to}\quad & 1 - (x_i - h/2)^2 \geqslant c/p_{11}, && (\mathrm{IC}_i) \\
& 1 - (x_i + h/2)^2 \geqslant pc/p_{11}, && (\mathrm{IC}_j) \\
& 1 - (x_i - h/2)^2 \geqslant \max\{1 - h^2/4 - c/p_{11}, 0\} + c/p_{11}, && (\mathrm{IR}_i) \\
& 1 - (x_i + h/2)^2 \geqslant \max\{1 - h^2/4 - c/p_{11}, 0\} + pc/p_{11}. && (\mathrm{IR}_j)
\end{aligned}$$

Clearly IR_i implies IC_i, and IR_j implies IC_j, so the IR constraints are the only relevant ones. Let $\underline{x}$ be the minimum x_i such that IR_i holds, and $\overline{x}$ be the maximum x_i such that IR_j holds. We have

$$\underline{x} := \max\left\{\frac{h}{2} - \sqrt{1 - \frac{c}{p_{11}}}, 0\right\} \quad \text{and} \quad \overline{x} := -\frac{h}{2} + \min\left\{\sqrt{\frac{1}{4}h^2 + \frac{1-p}{p_{11}}c}, \sqrt{1 - \frac{p}{p_{11}}c}\right\}.$$

If $h \leqslant \tilde{h}_3 = 2\sqrt{1 - \frac{c}{p_{11}}}$, then $\underline{x} = 0$ and $\overline{x} = -\frac{h}{2} + \sqrt{\frac{1}{4}h^2 + \frac{1-p}{p_{11}}c} > 0$, so $\underline{x} < \overline{x}$ and the problem is feasible. If $h > \tilde{h}_3$ then $\underline{x} \leqslant \overline{x}$ iff

$$h \leqslant \overline{h}_3 := \sqrt{1 - \frac{c}{p_{11}}} + \sqrt{1 - \frac{p}{p_{11}}c},$$

and clearly $\overline{h}_3 > \tilde{h}_3$.

Assume $h \leqslant \tilde{h}_3$. If $\overline{x} \geqslant \frac{h}{2}$, i.e., $h \leqslant \hat{h}_3 := \min\left\{\sqrt{\frac{4}{3}\frac{1-p}{p_{11}}c}, \tilde{h}_3\right\}$, then the proposer can choose her ideal policy $x_i = \frac{h}{2}$. If $h > \hat{h}_3$ then $\overline{x} < \frac{h}{2}$, so $x_i = \overline{x}$ is the optimal policy. Note that, differentiating

IR_j and using $\overline{x} > 0$, we have

$$\frac{\partial \overline{x}}{\partial h} = -\frac{1}{2} + \frac{1}{4}\frac{h}{\overline{x} + h/2} < 0,$$

so x_i is decreasing in h for $h \in (\hat{h}_3, \tilde{h}_3)$.

Finally, assume that $\tilde{h}_3 < h \leqslant \overline{h}_3$. We have that $\overline{x} = -\frac{h}{2} + \sqrt{1 - \frac{p}{p_{11}}c}$ is decreasing and continuous, and $\overline{x} < \frac{h}{2}$ when $h = \tilde{h}_3$, hence $\overline{x} < \frac{h}{2}$ for $\tilde{h}_3 < h \leqslant \overline{h}_3$. Hence, again, $x_i = \overline{x}$ is the optimal policy, and x_i is decreasing in h. This completes the proof.

B. *Proof of Proposition 3*

No-coalition payoffs.—If $\mu_1 \geqslant q > \mu$ we have $\underline{u}_i = \underline{u}_j = p(1 - \frac{1}{2}p)(2 - h^2) - c$.

Strategies.—There are four possible strategies in the coalitional lobbying subgame. First, *proposer works*. This is $e_i = 1$ and $e_j = 0$. If $s_i = 1$ then the groups communicate x_i and $m = s_i$, and the policymaker implements the proposal. Second, *follower works*. This is $e_i = 0$ and $e_j = 1$. If $s_j = 1$ then the groups communicate x_i and $m = s_j$, and the policymaker implements the proposal. Third, *both work*. This is $e_i = 1$ and $e_j = \mathbb{1}(s_i = 1)$. If $s_i = s_j = 1$ then the groups communicate x_i and $m = s_i + s_j$; the policymaker implements the proposal iff $m > 1$. Fourth, *none work*. This is $e_i = e_j = 0$. The groups don't lobby. If (off-path) a group exerts effort, finds favorable evidence, and $1 - (x_i - h/2)^2 \geqslant 0$ then the groups communicate it to the policymaker, who implements it.

Proposer works.—This is $e_i = 1$, $e_j = 0$. The proposer's problem is to

$$\begin{aligned}
\text{maximize}\quad & \Pr(s_i = 1)(1 + v_i(x_i)) - c \\
\text{subject to}\quad & \Pr(s_i = 1)(1 + v_i(x_i)) - c \geqslant 0, && (\mathrm{IC}_i)\\
& \Pr(s_j = 1|s_i = 0)(1 + v_j(x_i)) - c \leqslant 0, && (\mathrm{IC}_j)\\
& \Pr(s_i = 1)(1 + v_i(x_i)) - c \geqslant \underline{u}_i, && (\mathrm{IR}_i)\\
& \Pr(s_i = 1)(1 + v_j(x_i)) \geqslant \underline{u}_j. && (\mathrm{IR}_j)
\end{aligned}$$

We can re-write the problem as follows:

$$\begin{aligned}
\text{maximize}\quad & -(x_i - h/2)^2 \\
\text{subject to}\quad & 1 - (x_i - h/2)^2 \geqslant c/p, && (\mathrm{IC}_i)\\
& 1 - (x_i + h/2)^2 \leqslant c/p_{1|0}, && (\mathrm{IC}_j)\\
& 1 - (x_i - h/2)^2 \geqslant (1 - p/2)(2 - h^2), && (\mathrm{IR}_i)\\
& 1 - (x_i + h/2)^2 \geqslant (1 - p/2)(2 - h^2) - c/p. && (\mathrm{IR}_j)
\end{aligned}$$

If $c > 0$ is small enough then IC_i and IC_j are feasible. Let $\underline{x}_i$ be the minimum x_i such that IC_i holds, and let $\underline{x}_j$ be the minimum $x_i \geqslant -\frac{h}{2}$ such that IC_j holds. We have

$$\underline{x}_i := \frac{h}{2} - \sqrt{1 - \frac{c}{p}} \quad \text{and} \quad \underline{x}_j := -\frac{h}{2} + \sqrt{1 - \frac{c}{p_{1|0}}}.$$

Let $\underline{h}_i$ be the minimum $h \geqslant 0$ such that IR_i is feasible, and $\underline{h}_j$ be the minimum $h \geqslant 0$ such that IR_j is feasible. We have

$$\underline{h}_i := \sqrt{2 - \frac{1}{1 - p/2}} \quad \text{and} \quad \underline{h}_j := \sqrt{2 - \frac{1 + c/p}{1 - p/2}}.$$

Clearly $\underline{h}_i > \underline{h}_j$. If $h \geqslant \underline{h}_i$ let $\tilde{x}_i$ be the minimum x_i such that IR_i holds. If $h \geqslant \underline{h}_j$ let $\overline{x}_j$ be the maximum x_i such that IR_j holds. We have

$$\tilde{x}_i := \frac{h}{2} - \sqrt{1 - \left(1 - \frac{p}{2}\right)(2 - h^2)} \quad \text{and} \quad \overline{x}_j := -\frac{h}{2} + \sqrt{1 - \left(1 - \frac{p}{2}\right)(2 - h^2) + \frac{c}{p}}.$$

Note that $\tilde{x}_i > -\frac{h}{2}$ and if $c > 0$ is small enough then $\overline{x}_j < \frac{h}{2}$. (The inequalities reduce to $1 - p + \frac{1}{2}ph^2 > 0$, which is true.) Hence the optimal x_i, if it exists, must be $\overline{x}_j$. We conclude that there is a solution to the problem iff $h \geqslant \underline{h}_i$ and $\max\{\underline{x}_i, \underline{x}_j, \tilde{x}_i\} \leqslant \overline{x}_j$; in that case i chooses $x_i = \overline{x}_j$.

We have $\underline{x}_i \leqslant \overline{x}_j$ iff

$$\frac{h}{2} - \sqrt{1 - \frac{c}{p}} \leqslant -\frac{h}{2} + \sqrt{1 - \left(1 - \frac{p}{2}\right)(2 - h^2) + \frac{c}{p}},$$

i.e., $h - \sqrt{1 - \frac{c}{p}} \leqslant \sqrt{1 - \left(1 - \frac{p}{2}\right)(2 - h^2) + \frac{c}{p}}$. If $h \leqslant \sqrt{1 - \frac{c}{p}}$ then this clearly holds. Otherwise, we can square both sides and obtain $\frac{1}{2}ph^2 - 2h\sqrt{1 - \frac{c}{p}} + 2 - p - 2\frac{c}{p} \leqslant 0$, which holds as long as $h \leqslant \overline{h}_2$, where $\overline{h}_2$ is the largest h that satisfies the inequality.

We have $\underline{x}_j \leqslant \overline{x}_j$ iff

$$h \geqslant \tilde{h}_2 := \sqrt{2 - \frac{1/p + 1/p_{1|0}}{1 - p/2} c}.$$

Finally, differentiating and using $\tilde{x}_i > -\frac{h}{2}$ we obtain

$$\frac{\partial \tilde{x}_i}{\partial h} = \frac{1}{2} + \left(1 - \frac{p}{2}\right)\frac{h}{\tilde{x}_i - h/2} < -\frac{1 - p}{2}.$$

Differentiating and using $\overline{x}_j < \frac{h}{2}$ we obtain

$$\frac{\partial \overline{x}_j}{\partial h} = -\frac{1}{2} + \left(1 - \frac{p}{2}\right)\frac{h}{\overline{x}_j + h/2} > \frac{1 - p}{2}.$$

Hence $\tilde{x}_i$ decreases and $\overline{x}_j$ increases. When $c = 0$ we have $\tilde{h}_2 = \sqrt{2}$, and so if $h = \tilde{h}_2$ we have $\underline{x}_i = \tilde{x}_i = \frac{\sqrt{2}}{2} - 1$ and $\overline{x}_j = -\frac{\sqrt{2}}{2} + 1$, hence $\tilde{x}_i < \overline{x}_j$, and thus $\tilde{x}_i < \overline{x}_j$ for any $h \geqslant \tilde{h}_2$. Moreover, $\underline{x}_i < \overline{x}_j$, hence $\tilde{h}_2 < \overline{h}_2$. Therefore, by continuity there is $\overline{c} > 0$ such that $\tilde{x}_i < \overline{x}_j$ and $\tilde{h}_2 < \overline{h}_2$ for any $c < \overline{c}$.

In sum, if c is small enough then the problem has a solution iff $h \in [\tilde{h}_2, \overline{h}_2]$, where $0 < \tilde{h}_2 < \overline{h}_2$; IR_j always binds; at $\tilde{h}_2$ we have that IC_j binds, and at $\overline{h}_2$ we have that IC_i binds.

Follower works.—This is $e_i = 0$, $e_j = 1$. The proposer's problem is to

$$
\begin{aligned}
\text{maximize}\quad & \Pr(s_j = 1)(1 + v_i(x_i)) \\
\text{subject to}\quad & \Pr(s_i = 1 \vee s_j = 1)(1 + v_i(x_i)) - c \leqslant \Pr(s_j = 1)(1 + v_i(x_i)), && (\mathrm{IC}_i) \\
& \Pr(s_j = 1)(1 + v_j(x_i)) - c \geqslant 0, && (\mathrm{IC}_j) \\
& \Pr(s_j = 1)(1 + v_i(x_i)) \geqslant \underline{u}_i, && (\mathrm{IR}_i) \\
& \Pr(s_j = 1)(1 + v_j(x_i)) - c \geqslant \underline{u}_j. && (\mathrm{IR}_j)
\end{aligned}
$$

We can re-write the problem as follows:

$$
\begin{aligned}
\text{maximize}\quad & -(x_i - h/2)^2 \\
\text{subject to}\quad & 1 - (x_i - h/2)^2 \leqslant c/(p - p_{11}), && (\mathrm{IC}_i) \\
& 1 - (x_i + h/2)^2 \geqslant c/p, && (\mathrm{IC}_j) \\
& 1 - (x_i - h/2)^2 \geqslant (1 - p/2)(2 - h^2), && (\mathrm{IR}_i) \\
& 1 - (x_i + h/2)^2 \geqslant (1 - p/2)(2 - h^2) - c/p. && (\mathrm{IR}_j)
\end{aligned}
$$

If c is small enough then IC_i and IC_j are feasible. Let $\overline{x}_i$ be the maximum $x_i < \frac{h}{2}$ such that IC_i holds, and let $\overline{x}_j$ be the maximum x_i such that IC_j holds. We have

$$\overline{x}_i := \frac{h}{2} - \sqrt{1 - \frac{c}{p - p_{11}}} \quad \text{and} \quad \overline{x}_j := -\frac{h}{2} + \sqrt{1 - \frac{c}{p}}.$$

Let $\underline{h}_i$ be the minimum $h > 0$ such that IR_i is feasible, and let $\underline{h}_j$ be the minimum $h > 0$ such that IR_j is feasible, assuming c small enough. We have

$$\underline{h}_i := \sqrt{2 - \frac{1}{1 - p/2}} \quad \text{and} \quad \underline{h}_j := \sqrt{2 - \frac{1 + c/p}{1 - p/2}}.$$

Clearly $\underline{h}_i > \underline{h}_j$. If $h \geqslant \underline{h}_i$ let $\tilde{x}_i$ be the minimum x_i such that IR_i holds, and let $\tilde{x}_j$ be the maximum x_i such that IR_j holds. We have

$$\tilde{x}_i := \frac{h}{2} - \sqrt{1 - \left(1 - \frac{p}{2}\right)(2 - h^2)} \quad \text{and} \quad \tilde{x}_j := -\frac{h}{2} + \sqrt{1 - \left(1 - \frac{p}{2}\right)(2 - h^2) + \frac{c}{p}}.$$

Note that $\tilde{x}_i > -\frac{h}{2}$ and $\tilde{x}_j < \frac{h}{2}$. The problem is feasible iff $h \geqslant \underline{h}_i$ and $\tilde{x}_i \leqslant \min\{\overline{x}_i, \overline{x}_j, \tilde{x}_j\}$.

We have $\tilde{x}_i \leqslant \overline{x}_i$ iff

$$h \geqslant \underline{h} := \sqrt{2 - \frac{c}{(p - p_{11})(1 - p/2)}},$$

and $\underline{h} > \underline{h}_i$ if c is small enough. As before, $\tilde{x}_i$ is decreasing in h, and $\tilde{x}_j$ is increasing in h, and $\tilde{x}_i = \frac{\sqrt{2}}{2} - 1 < -\frac{\sqrt{2}}{2} + 1 = \tilde{x}_j$ if $h = \underline{h} = \sqrt{2}$ and $c = 0$, hence $\tilde{x}_i < \tilde{x}_j$ for every $h \geqslant \underline{h}$ if c is small enough. Also $\underline{h} > \underline{h}_i$ if c is small enough. Finally, $\tilde{x}_i \leqslant \overline{x}_j$ iff

$$h \leqslant \overline{h} = \sqrt{1 - \left(1 - \frac{p}{2}\right)(2 - \overline{h}^2)} + \sqrt{1 - \frac{c}{p}}.$$

Hence the problem is feasible iff $h \in [\underline{h}, \overline{h}]$ if c is small enough, and the solution is $x_i = \min\{\overline{x}_i, \overline{x}_j, \tilde{x}_j\}$.

Let's calculate $x_i = \min\{\overline{x}_i, \overline{x}_j, \tilde{x}_j\}$. We have $\overline{x}_i \leqslant \overline{x}_j$ iff $h \leqslant \sqrt{1 - \frac{c}{p - p_{11}}} + \sqrt{1 - \frac{c}{p}}$. We have $\overline{x}_i \leqslant \tilde{x}_j$ iff $h \leqslant \sqrt{1 - \frac{c}{p - p_{11}}} + \sqrt{1 - \left(1 - \frac{p}{2}\right)(2 - h^2) + \frac{c}{p}}$. We have $h \leqslant \sqrt{1 - \left(1 - \frac{p}{2}\right)(2 - h^2)} + \sqrt{1 - \frac{c}{p}}$

We have $\tilde{h}_2 < \underline{h}$ (where $\tilde{h}_2$ is the minimum h such that the "proposer works" strategy is feasible) iff $p(1-p) > p_{11}$ by an easy computation. We have

$$\overline{h} = \frac{\sqrt{1 - \frac{c}{p}} + \sqrt{1 - \frac{c}{p} - p + \frac{1}{2}p^2 + \frac{1}{2}c}}{p/2} < \frac{\sqrt{1 - \frac{c}{p}} + \sqrt{1 - \frac{c}{p} - p + \frac{1}{2}p^2 + c}}{p/2} = \overline{h}_2,$$

where $\overline{h}_2$ is the maximum h such that the "proposer works" strategy is feasible. Now $x_i = \min\{\overline{x}_i, \overline{x}_j, \tilde{x}_j\} \leqslant \tilde{x}_j$, which is the optimal policy in the "proposer works" strategy. **I'll assume that in the small region where both strategies yield the same expected payoff for the proposer, she chooses the "proposer works" strategy**, since it doesn't change the interpretation of the result. In sum, if $p(1-p) > p_{11}$ then the proposer never implements the "proposer works" strategy. She implements it only if $p_{11} > p(1-p)$ and $h \in [\underline{h}, \tilde{h}_2)$.

Both work.—This is $e_i = 1$ and $e_j = \mathbb{1}(s_i = 1)$. The proposer's problem is to

$$\begin{aligned}
\text{maximize} \quad & \Pr(s_i = s_j = 1)(1 + v_i(x_i)) - c \\
\text{subject to} \quad & \Pr(s_i = s_j = 1)(1 + v_i(x_i)) - c \geqslant 0, && (\mathrm{IC}_i) \\
& \Pr(s_j = 1 | s_i = 1)(1 + v_j(x_i)) - c \geqslant 0, && (\mathrm{IC}_j) \\
& \Pr(s_i = s_j = 1)(1 + v_i(x_i)) - c \geqslant \underline{u}_i, && (\mathrm{IR}_i) \\
& \Pr(s_i = s_j = 1)(1 + v_j(x_i)) - \Pr(s_i = 1)c \geqslant \underline{u}_j. && (\mathrm{IR}_j)
\end{aligned}$$

We can re-write this problem as follows:

$$\begin{aligned}
\text{maximize}\quad & -(x_i - h/2)^2 \\
\text{subject to}\quad & 1-(x_i - h/2)^2 \geqslant c/p_{11}, && (\mathrm{IC}_i)\\
& 1-(x_i + h/2)^2 \geqslant c/p_{1|1}, && (\mathrm{IC}_j)\\
& 1-(x_i - h/2)^2 \geqslant p(1-p/2)(2-h^2)/p_{11}, && (\mathrm{IR}_i)\\
& 1-(x_i + h/2)^2 \geqslant p(1-p/2)(2-h^2)/p_{11} - (1-p)c/p_{11}. && (\mathrm{IR}_j)
\end{aligned}$$

If $c > 0$ is small enough then IC_i and IC_j are feasible. Let $\underline{x}_i$ be the smallest x_i such that IC_i holds, and let $\overline{x}_j$ be the largest x_i such that IC_j holds. We have

$$\underline{x}_i := \frac{h}{2} - \sqrt{1-\frac{c}{p_{11}}} \quad \text{and} \quad \overline{x}_j := -\frac{h}{2} + \sqrt{1-\frac{c}{p_{1|1}}}.$$

Let $\underline{h}_i$ be the smallest $h > 0$ such that IR_i is feasible and let $\underline{h}_j$ be the smallest $h > 0$ such that IR_j is feasible (assuming c is small enough). We have

$$\underline{h}_i := \sqrt{2 - \frac{p_{11}}{p(1-p/2)}} \quad \text{and} \quad \underline{h}_j := \sqrt{2 - \frac{p_{11}}{p(1-p/2)}\left(1 + \frac{1-p}{p_{11}}c\right)}.$$

Clearly $\underline{h}_i > \underline{h}_j$. If $h \geqslant \underline{h}_i$ let $\tilde{x}_i$ be the smallest x_i such that IR_i holds, and let $\tilde{x}_j$ be the largest x_i such that IR_j holds. We have

$$\tilde{x}_i := \frac{h}{2} - \sqrt{1 - \frac{p}{p_{11}}\left(1-\frac{p}{2}\right)(2-h^2)} \quad \text{and} \quad \tilde{x}_j := -\frac{h}{2} + \sqrt{1 - \frac{p}{p_{11}}\left(1-\frac{p}{2}\right)(2-h^2) + \frac{1-p}{p_{11}}c}.$$

The problem is feasible iff $\max\{\underline{x}_i, \tilde{x}_i\} \leqslant \min\{\overline{x}_j, \tilde{x}_j\}$.

We have $\underline{x}_i \leqslant \overline{x}_j$ iff

$$h \leqslant \tilde{h} := \sqrt{1-\frac{c}{p_{11}}} + \sqrt{1-\frac{c}{p_{1|1}}}.$$

We have $\underline{x}_i \leqslant \tilde{x}_j$ iff

$$h - \sqrt{1-\frac{c}{p_{11}}} \leqslant \sqrt{1 - \frac{p}{p_{11}}\left(1-\frac{p}{2}\right)(2-h^2) + \frac{1-p}{p_{11}}c}.$$

If $\underline{h}_j \leqslant h \leqslant \sqrt{1-\frac{c}{p_{11}}}$ then this is true. If $h \geqslant \sqrt{1-\frac{c}{p_{11}}}$ we can square both sides and get

$$\left[1 - \frac{p}{p_{11}}\left(1-\frac{p}{2}\right)\right]h^2 - 2h\sqrt{1-\frac{c}{p_{11}}} + \frac{2-p}{p_{11}}(p-c) \leqslant 0.$$

If $p_{11} > p(1-p/2)$ then $\underline{h}_j < \sqrt{1-\frac{c}{p_{11}}}$ if c is small, since $\underline{h}_j \to \sqrt{2-\frac{p_{11}}{p(1-p/2)}} < 1$. Hence we have $\underline{x}_i \leqslant \tilde{x}_j$ if $h \leqslant \overline{h}$, where $\overline{h}$ is the maximum $h \geqslant 0$ that satisfies the inequality. If $p_{11} \leqslant p(1-p/2)$ then $\underline{h}_j > \sqrt{1-\frac{c}{p_{11}}}$, since otherwise, squaring, we get $2 - \frac{p_{11}}{p(1-p/2)}\left(1+\frac{1-p}{p_{11}}c\right) \leqslant 1-\frac{c}{p_{11}}$, i.e.,

$$1 \leqslant \frac{p_{11}}{p(1-p/2)} + \frac{p_{11}}{p(1-p/2)}\frac{1-p/2-p/2}{p_{11}}c - \frac{c}{p_{11}} = \underbrace{\frac{p_{11}}{p(1-p/2)}}_{\leqslant 1} + \underbrace{\frac{c}{p} - \frac{c}{p_{11}} - \frac{1/2}{1-p/2}}_{<0} < 1,$$

absurd. When $h = \underline{h}_j$ we have $\underline{x}_i = \frac{\underline{h}_j}{2} - \sqrt{1-\frac{c}{p_{11}}} > -\frac{\underline{h}_j}{2} = \tilde{x}_j$, and for $h \geqslant \underline{h}_j$ this must also be true. Hence the problem is only feasible if $p_{11} > p(1-p/2)$, and in that case $\underline{x}_i \leqslant \tilde{x}_j$ iff $h \leqslant \overline{h}$.

We have $\tilde{x}_i \leqslant \overline{x}_j$ iff

$$h - \sqrt{1-\frac{c}{p_{1|1}}} \leqslant \sqrt{1-\frac{p}{p_{11}}\left(1-\frac{p}{2}\right)(2-h^2)}.$$

If $\underline{h}_i \leqslant h \leqslant \sqrt{1-\frac{c}{p_{1|1}}}$ then this is true. If $h \geqslant \sqrt{1-\frac{c}{p_{1|1}}}$ we can square both sides and get

$$\left[1-\frac{p}{p_{11}}\left(1-\frac{p}{2}\right)\right]h^2 - 2h\sqrt{1-\frac{c}{p_{1|1}}} + \frac{p}{p_{11}}(2-p) - \frac{c}{p_{1|1}} \leqslant 0.$$

If $p_{11} > p(1-p/2)$ then $\underline{h}_i < \sqrt{1-\frac{c}{p_{1|1}}}$ if c is small, since $\underline{h}_i = \sqrt{2-\frac{p_{11}}{p(1-p/2)}} < 1$. Hence we have $\tilde{x}_i \leqslant \overline{x}_j$ iff $h \leqslant \overline{h}'$, where $\overline{h}'$ is the maximum $h \geqslant 0$ that satisfies the inequality.

Finally, we have $\tilde{x}_i > -\frac{h}{2}$ and $\tilde{x}_j < \frac{h}{2}$ if c is small enough, so, taking derivatives, we get

$$\frac{\partial \tilde{x}_i}{\partial h} = \frac{1}{2} - \frac{p}{p_{11}}\left(1-\frac{p}{2}\right)\frac{h}{h/2-\tilde{x}_i} < \frac{1}{2} - \frac{p}{p_{11}}\left(1-\frac{p}{2}\right) < 0,$$

and

$$\frac{\partial \tilde{x}_j}{\partial h} = -\frac{1}{2} + \frac{p}{p_{11}}\left(1-\frac{p}{2}\right)\frac{h}{h/2+\tilde{x}_j} > -\frac{1}{2} + \frac{p}{p_{11}}\left(1-\frac{p}{2}\right) > 0.$$

Now, if $h = \underline{h}_i$, $\tilde{x}_i = \frac{h}{2}$ and so $\tilde{x}_i > \tilde{x}_j$. Hence there is $\underline{h}' > \underline{h}_i$ such that $\tilde{x}_i = \tilde{x}_j$ for $h = \underline{h}'$ and $\tilde{x}_i \leqslant \tilde{x}_j$ holds for every $h \geqslant \underline{h}'$.

Putting everything together, the problem is feasible iff $p_{11} > p(1-p/2)$ and $\max\{\underline{h}_i, \underline{h}'\} \leqslant h \leqslant \min\{\tilde{h}, \overline{h}, \overline{h}'\}$. When $c = 0$ we have $\underline{h}_i = \sqrt{2-\frac{p_{11}}{p(1-p/2)}}$, $\underline{h}' = \sqrt{2-\frac{1}{\frac{p}{p_{11}}(2-p)-\frac{1}{2}}}$, $\tilde{h} = 2$, $\overline{h} = \overline{h}' = \frac{1+\sqrt{1-\left[1-\frac{p}{p_{11}}\left(1-\frac{p}{2}\right)\right]\frac{p}{p_{11}}(2-p)}}{1-\frac{p}{p_{11}}\left(1-\frac{p}{2}\right)}$. Now it's easy to verify that $\tilde{h} < \overline{h}, \overline{h}'$ and $\underline{h}' > \underline{h}_i$ using $p(1-p/2) < p_{11} < p$. This also holds for small c by continuity. Hence the problem is feasible iff $\underline{h}' \leqslant h \leqslant \tilde{h}$. Given that $\tilde{x}_j < h/2$, we have $x_i = \min\{\overline{x}_j, \tilde{x}_j\}$. If $c = 0$ we have

$\tilde{x}_j = \frac{h}{2} - \sqrt{1 - \frac{p}{p_{11}}\left(1 - \frac{p}{2}\right)(2 - h^2)} > \frac{h}{2} - 1 = \overline{x}_j$, so $\tilde{x}_j > \overline{x}_j$ if c is small enough. Hence $x_i = \tilde{x}_j$.

In sum, if c is small enough the problem is feasible iff $p_{11} > p(1 - p/2)$ and $h \in [\underline{h}', \tilde{h}]$, in which case $x_i = \tilde{x}_j$. The expected payoff for the proposer is $p_{11}(1 - (\tilde{x}_j - h/2)^2) - c$. If she uses the "proposer works" strategy, her expected payoff is $p(1 - (x^* - h/2)^2) - c$. When $c \to 0$ we have that $\tilde{x}_j - x^* \to 0$, so she is better off using the "proposer works" strategy, since $p > p_{11}$. The latter is available for $h \in [\tilde{h}_2, \overline{h}_2]$. We have $\overline{h}_2 > \tilde{h}$ when c is small, but $\underline{h}' < \tilde{h}_2$. Hence the proposer will only choose this strategy if $p_{11} > p(1 - p/2)$ and $h \in [\underline{h}', \tilde{h}_2)$.

If $p_{11} > p(1 - p/2)$ then $p_{11} > p(1 - p)$, so if $h \in [h_0, \tilde{h}_2)$ then the "follower strategy" is feasible, where $h_0 := \sqrt{2 - \frac{c}{(p - p_{11})(1 - p/2)}}$. We have $\underline{h}' < h_0$ if c is small, so if $h \in [\underline{h}', h_0)$ then the proposer chooses the "both work" strategy.

None work.—This is $e_i = e_j = 0$. Incentive compatibility requires that none of the groups want to exert effort collecting information on the value of the policy. This is $p(1 - v_i(x_i)) - c \leqslant 0$ and $p(1 - v_j(x_i)) - c \leqslant 0$. If x_i is large enough then both are satisfied. Individual rationality requires that $0 \geqslant \underline{u}_i, \underline{u}_j$, i.e., $h \geqslant \sqrt{2}$. The expected payoff for the proposer is 0. Now $\tilde{h}_2 < \sqrt{2}$, and the expected payoff when the proposer exerts effort is generically positive, so if $h \leqslant \overline{h}_2$ then the proposer prefers exerting effort. If $h > \overline{h}_2$, however, the proposer chooses this strategy.

Summary.—There are two cases. If $p_{11} < p(1 - p)$ then there is $\overline{c} > 0$ and $0 < \tilde{h}_2 < \overline{h}_2$ such that if $c < \overline{c}$ then in equilibrium no coalition is formed if $h \leqslant \tilde{h}_2$, the groups use the follower work strategy if $h \in [\tilde{h}_2, \overline{h}_2]$, and the none work strategy if $h \geqslant \overline{h}_2$. This proves Proposition 3. If $p_{11} \geqslant p(1 - p)$ then there is $0 < h' < \tilde{h}_2$ such that the same holds except that if $h \in [h', \tilde{h}_2]$ the groups choose the "follower works" or "both work" strategies.

C. *Proof of Proposition 4*

Strategies.—The four strategies available in the case $\mu_1 \geqslant q > \mu_{\geqslant 1}$ are still available in the $\mu_{\geqslant 1} \geqslant q > \mu$, but there is a new strategy in this case, that I call *persuasion*. This is $e_i = 1$ and $e_j = \mathbb{1}(s_i = 0)$. If $s_i + s_j = 1$ then the groups communicate x_i and $m = s_i + s_j$, and the policymaker implements the proposal.

Persuasion.—The proposer's problem is to

$$\begin{aligned}
\text{maximize} \quad & \Pr(s_i + s_j \geqslant 1)(1 + v_i(x_i)) - c \\
\text{subject to} \quad & \Pr(s_i + s_j \geqslant 1)(1 + v_i(x_i)) - c \geqslant \Pr(s_j = 1)(1 + v_i(x_i)), && (\text{IC}_i) \\
& \Pr(s_j = 1 | s_i = 0)(1 + v_j(x_i)) - c \geqslant 0, && (\text{IC}_j) \\
& \Pr(s_i + s_j \geqslant 1)(1 + v_i(x_i)) - c \geqslant \underline{u}_i, && (\text{IR}_i) \\
& \Pr(s_i + s_j \geqslant 1)(1 + v_j(x_i)) - \Pr(s_i = 0)c \geqslant \underline{u}_j. && (\text{IR}_j)
\end{aligned}$$

We can re-write the problem as follows:

$$
\begin{aligned}
\text{maximize}\quad & -(x_i - h/2)^2 \\
\text{subject to}\quad & 1-(x_i - h/2)^2 \geqslant c/p_{10}, && (\mathrm{IC}_i)\\
& 1-(x_i + h/2)^2 \geqslant c/p_{1|0}, && (\mathrm{IC}_j)\\
& 1-(x_i - h/2)^2 \geqslant p(1-p/2)(2-h^2)/p_{\geqslant 1}, && (\mathrm{IR}_i)\\
& 1-(x_i + h/2)^2 \geqslant p(1-p/2)(2-h^2)/p_{\geqslant 1} - pc/p_{\geqslant 1}. && (\mathrm{IR}_j)
\end{aligned}
$$

If c is small enough then IC_i and IC_j are feasible. Let $\underline{x}_i$ be the minimum x_i such that IC_i holds, and let $\overline{x}_j$ be the maximum x_i such that IC_j holds. We have

$$\underline{x}_i := \frac{h}{2} - \sqrt{1-\frac{c}{p_{10}}} \quad\text{and}\quad \overline{x}_j := -\frac{h}{2} + \sqrt{1-\frac{c}{p_{1|0}}}.$$

Let $\underline{h}_i$ be the minimum $h > 0$ such that IR_i is feasible and let $\underline{h}_j$ be the smallest $h > 0$ such that IR_j is feasible (assuming c is small enough). We have

$$\underline{h}_i := \sqrt{2-\frac{p_{\geqslant 1}}{p(1-p/2)}} \quad\text{and}\quad \underline{h}_j := \sqrt{2-\frac{p_{\geqslant 1}+pc}{p(1-p/2)}}.$$

Clearly $\underline{h}_i > \underline{h}_j$. If $h \geqslant \underline{h}_i$ let $\tilde{x}_i$ be the minimum x_i such that IR_i holds, and let $\tilde{x}_j$ be the maximum x_i such that IR_j holds. We have

$$\tilde{x}_i := \frac{h}{2} - \sqrt{1-\frac{p}{p_{\geqslant 1}}\left(1-\frac{p}{2}\right)(2-h^2)} \quad\text{and}\quad \tilde{x}_j := -\frac{h}{2} + \sqrt{1-\frac{p}{p_{\geqslant 1}}\left(1-\frac{p}{2}\right)(2-h^2)+\frac{p}{p_{\geqslant 1}}c}.$$

The problem is feasible iff $h \geqslant \underline{h}_i$ and $\max\{\underline{x}_i, \tilde{x}_i\} \leqslant \min\{\overline{x}_j, \tilde{x}_j\}$.

We have $\underline{x}_i \leqslant \overline{x}_j$ iff

$$h \leqslant \tilde{h} := \sqrt{1-\frac{c}{p_{10}}} + \sqrt{1-\frac{c}{p_{1|0}}}.$$

We have $\underline{x}_i \leqslant \tilde{x}_j$ iff

$$h - \sqrt{1-\frac{c}{p_{10}}} \leqslant \sqrt{1-\frac{p}{p_{\geqslant 1}}\left(1-\frac{p}{2}\right)(2-h^2)+\frac{p}{p_{\geqslant 1}}c}.$$

If $\underline{h}_i \leqslant h \leqslant \sqrt{1-\frac{c}{p_{10}}}$ then this is true. If $h \geqslant \sqrt{1-\frac{c}{p_{10}}}$ we can square both sides and get

$$\left[1-\frac{p}{p_{10}}\left(1-\frac{p}{2}\right)\right]h^2 - 2h\sqrt{1-\frac{c}{p_{10}}} + \frac{p}{p_{\geqslant 1}}(2-p) - \frac{c}{p_{10}} - \frac{p}{p_{\geqslant 1}}c \leqslant 0.$$

Now $1-\frac{p}{p_{10}}\left(1-\frac{p}{2}\right) < 0$, since this is $p_{10} < p(1-p/2)$, but $p_{10} = p - p_{11}$, so this is $p_{11} > \frac{1}{2}p^2$, but

$p_{11} > p^2$ by Jensen. We have $\underline{h}_i < 1$, so if c is small enough then $\underline{h}_i < \sqrt{1-\frac{c}{p_{10}}}$, so if $h = \sqrt{1-\frac{c}{p_{10}}}$ then the inequality holds. Therefore it holds for any $h \geqslant \underline{h}_i$.

We have $\tilde{x}_i \leqslant \overline{x}_j$ iff

$$h - \sqrt{1-\frac{c}{p_{1|0}}} \leqslant \sqrt{1-\frac{p}{p_{\geqslant 1}}\left(1-\frac{p}{2}\right)(2-h^2)}.$$

If $\underline{h}_i \leqslant h \leqslant \sqrt{1-\frac{c}{p_{1|0}}}$ then this is true. If $h \geqslant \sqrt{1-\frac{c}{p_{1|0}}}$ we can square both sides and get

$$\left[1-\frac{p}{p_{10}}\left(1-\frac{p}{2}\right)\right]h^2 - 2h\sqrt{1-\frac{c}{p_{1|0}}} + \frac{p}{p_{10}}(2-p) - \frac{c}{p_{1|0}} \leqslant 0.$$

We have $\underline{h}_i < 1$, so if c is small enough then $\underline{h}_i < \sqrt{1-\frac{c}{p_{1|0}}}$, so if $h = \sqrt{1-\frac{c}{p_{1|0}}}$ then the inequality holds. Therefore it holds for any $h \geqslant \underline{h}_i$.

We have $\tilde{x}_i \leqslant \tilde{x}_j$ if h is large enough, since, using $\tilde{x}_i > -\frac{h}{2}$ and $\tilde{x}_j < \frac{h}{2}$,

$$\frac{\partial \tilde{x}_i}{\partial h} = \frac{1}{2} - \left(1-\frac{p}{2}\right)\frac{h}{h/2-\tilde{x}_i} < -\frac{1-p}{2}$$

and

$$\frac{\partial \tilde{x}_j}{\partial h} = -\frac{1}{2} + \frac{p}{p_{\geqslant 1}}\left(1-\frac{p}{2}\right)\frac{h}{h/2+\tilde{x}_j} > -\frac{1}{2} + \frac{p}{p_{\geqslant 1}}\left(1-\frac{p}{2}\right) > -\frac{1-p}{2} > \frac{\partial \tilde{x}_i}{\partial h},$$

so $\tilde{x}_j - \tilde{x}_i$ is strictly increasing in h and $\lim_{h\to+\infty}(\tilde{x}_j - \tilde{x}_i) = +\infty$. If $h = \underline{h}_i$ we have $\tilde{x}_i = \frac{\underline{h}_i}{2}$ and $\tilde{x}_j = -\frac{\underline{h}_i}{2} + \sqrt{\frac{p}{p_{\geqslant 1}}c}$, hence $\tilde{x}_i > \tilde{x}_j$ if c is small enough. Therefore $\tilde{x}_i \leqslant \tilde{x}_j$ iff $h \geqslant \underline{h}$, where $\underline{h}$ is such that $\tilde{x}_i = \tilde{x}_j$ iff $h = \underline{h}$.

The problem is feasible iff $\underline{h} \leqslant h \leqslant \tilde{h}$, in which case $x_i = \min\{\overline{x}_j, \tilde{x}_j\}$. If $c = 0$ we have $\tilde{h} = 2$, and plugging $h = 2$ we have that $\tilde{x}_i < \tilde{x}_j$ is $2 < \sqrt{3-p} + \sqrt{1+\frac{p}{p_{\geqslant 1}}(2-p)}$, which is clearly true. Hence we have $\underline{h} < \tilde{h}$ if c is small enough. We have $\overline{x}_j \leqslant \tilde{x}_j$ iff

$$h \geqslant \sqrt{2 - \frac{p/p_{\geqslant 1} + 1/p_{1|0}}{p/p_{\geqslant 1}(1-p/2)}c} = \sqrt{2 - \frac{1/p + 1/p_{1|0}}{1-p/2}c} = \tilde{h}_2.$$

If $c = 0$ we have $\tilde{h}_2 = \sqrt{2}$, and $\underline{h} < \tilde{h}_2 < \tilde{h}$, which must hold if c is small enough. Hence $x_i = \tilde{x}_j$ if $h \in [\underline{h}, \tilde{h}_2]$ and $x_i = \overline{x}_j$ if $h \in [\tilde{h}_2, \tilde{h}]$. Note that $\tilde{x}_j$ is increasing in h if $p(2-p) > p_{\geqslant 1}$, and $\overline{x}_j$ is decreasing in h, so x_i can be non-monotonic.

In sum, if c is small enough the problem is feasible iff $\underline{h} \leqslant h \leqslant \tilde{h}$, in which case we have

$$x_i = \begin{cases} \tilde{x}_j, & \text{if } \underline{h} \leqslant h \leqslant \tilde{h}_2, \text{ and} \\ \overline{x}_j, & \text{if } \tilde{h}_2 \leqslant h \leqslant \tilde{h}, \end{cases}$$

where $0 < \underline{h} < \tilde{h}_2 < \tilde{h}$.

Assuming that $p_{11} < p(1-p)$ we have that, ignoring this strategy, the groups lobby together if $h < \tilde{h}_2$, use the "proposer works" strategy if $h \in [\tilde{h}_2, \overline{h}_2]$, and form a coalition but don't lobby if $h > \overline{h}_2$. When $c = 0$ we have $\tilde{h}_2 = \sqrt{2}$, $\overline{h}_2 = \frac{1+\sqrt{1-p+\frac{1}{2}p^2}}{p/2} > 2$, $\underline{h} < \sqrt{2}$ and $\tilde{h} = 2$. Hence $\underline{h} < \tilde{h}_2 < \tilde{h} < \overline{h}_2$ if c is small enough, and persuasion is an equilibrium when $h \in [\underline{h}, \tilde{h}_2]$. When $h \in [\tilde{h}_2, \tilde{h}]$ the proposer has to choose between persuasion and the "proposer works" strategy. Under persuasion her expected payoff is $U_1 = p_{\geqslant 1}(1 - (\overline{x}_j - h/2)^2) - c$, and under the "proposer works" strategy her payoff is $U_2 = p(1 - (x^* - h/2)^2) - c$, where $x^* = -\frac{h}{2} + \sqrt{1 - \left(1 - \frac{p}{2}\right)(2 - h^2) + \frac{c}{p}}$. Now, $\overline{x}_j$ is decreasing in h, so U_1 is decreasing in h. On the other hand,

$$\frac{\partial U_2}{\partial h} = -2p \underbrace{\left(\frac{h}{2} - x^*\right)}_{>0} \underbrace{\left(\frac{1}{2} - \frac{\partial x^*}{\partial h}\right)}_{<0} > 0,$$

since

$$\frac{\partial x^*}{\partial h} = -\frac{1}{2} + \left(1 - \frac{p}{2}\right) \frac{h}{x^* + h/2} > -\frac{1}{2} + \left(1 - \frac{p}{2}\right) \frac{h}{\frac{1}{2}(1-p)h + h/2} = \frac{1}{2},$$

because $x^* < \frac{1}{2}(1-p)h$, if $h < \frac{1-p-c/p}{p/2(1-p/2)}$. Now $h \leqslant \tilde{h}$, and if $c = 0$ we have $\tilde{h} = 2 < \frac{1-p-c/p}{p/2(1-p/2)}$ iff $p < 2 - \sqrt{2}$. So, if $p < 2 - \sqrt{2}$ we have that U_2 is increasing in h for $h \in [\tilde{h}_2, \tilde{h}]$. Now when $h = \tilde{h}_2$ and $c = 0$ we have $\overline{x}_j = x^*$, so $U_1 > U_2$ since $p_{\geqslant 1} > p$, hence $U_1 > U_2$ when $h = \tilde{h}_2$ if c is small enough. When $h = \tilde{h}$ and $c = 0$ we have $h = 2$, $\overline{x}_j = 0$ and $x^* = \sqrt{3-p} - 1$, so $U_1 = 0$ and $U_2 = p(1 - (2 - \sqrt{3-p}))^2 > 0$. Therefore $U_1 < U_2$ when $h = \tilde{h}$ and c is small enough. Therefore there is $\overline{h}_1 \in (\tilde{h}_2, \tilde{h})$ such that when $h \in [\underline{h}, \overline{h}_1]$ the proposer chooses persuasion, and for $h \in [\overline{h}_1, \overline{h}_2]$ the proposer chooses a moderating coalition. Let $\tilde{h}_1 := \underline{h}$. We proved Proposition 4.

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