Information collusion in lobbying coalitions

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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? In order 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 (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.

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.

[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.

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 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 $p_{11} < p < p_{\geqslant 1}$.

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.*

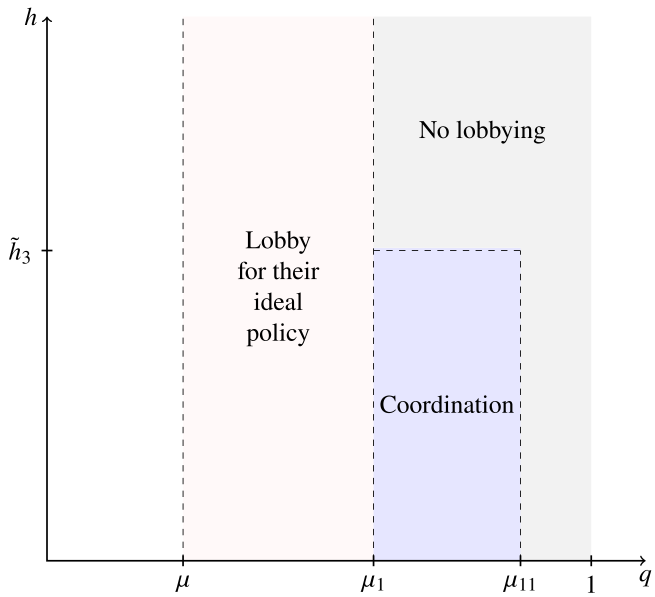

Figure 1: Equilibria in the no-coalition subgame, with $\mu = .25$, $\mu_0 = .1$, $\mu_1 = .6$, $c = .1$.

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:

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

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 $\tilde{h}_3 \leqslant h \leqslant \bar{h}_3$, 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.

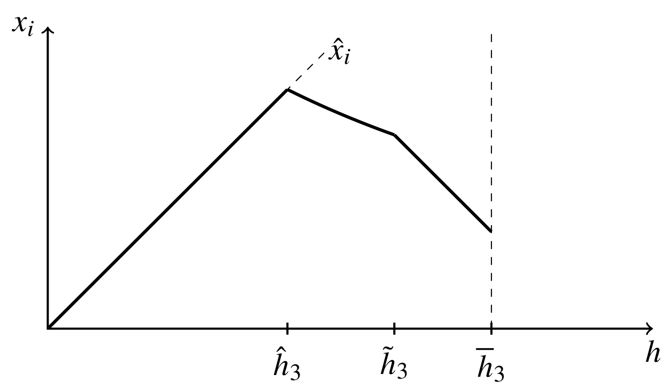

Figure 2: Equilibrium x_i with $\mu = .25$, $\mu_0 = .1$, $\mu_1 = .6$, $c = .1$, $\mu_{11} \geqslant q > \mu_1$, and $\hat{x}_i = \frac{h}{2}$.

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 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, the proposer exerts effort and the follower free-rides, 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.,

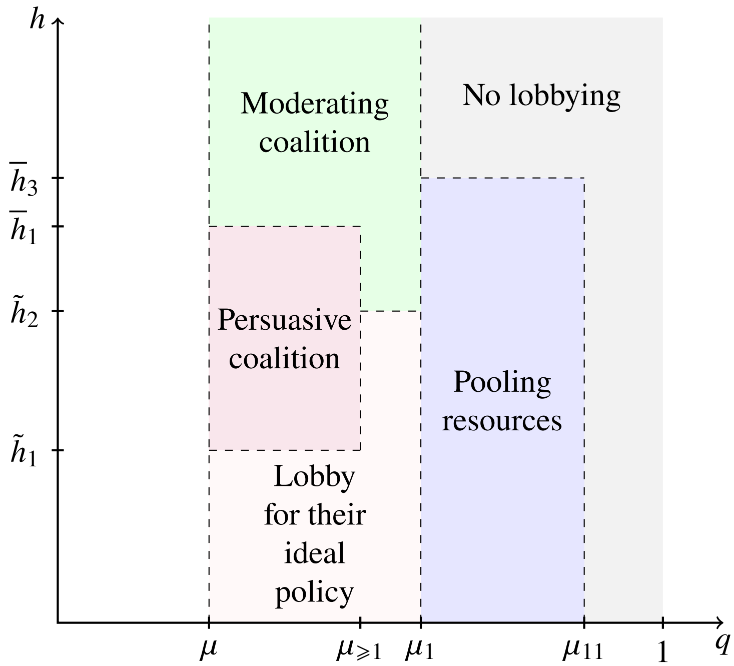

Figure 4: Equilibria with $\mu = .25$, $\mu_0 = .1$, $\mu_1 = .6$, $c = .1$.

$h \in [\tilde{h}_2, \overline{h}_2]$, 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.

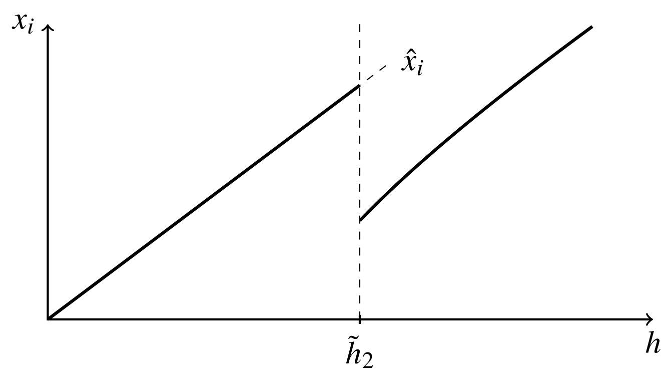

Figure 3: Equilibrium x_i with $\mu = .25$, $\mu_0 = .1$, $\mu_1 = .6$, $c = .1$, $\mu_1 \geqslant q > \mu_{\geqslant 1}$, and $\hat{x}_i = \frac{h}{2}$.

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 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.

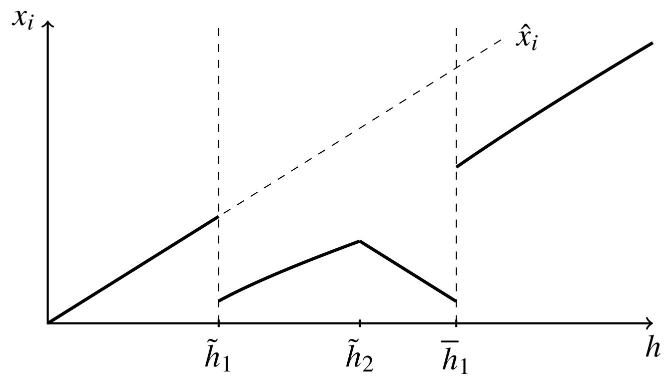

Figure 5: Equilibrium x_i with $\mu = .25$, $\mu_0 = .1$, $\mu_1 = .6$, $c = .1$, $\mu_{\geqslant 1} \geqslant q > \mu$, and $\hat{x}_i = \frac{h}{2}$.

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.

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

$$\text{maximize} \;\; \Pr(s_i = s_j = 1)(1 + v_i(x_i)) - c$$

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

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

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

We can re-write the problem as follows:

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

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 $\tilde{x}_i \leqslant \min\{\bar{x}_i, \bar{x}_j, \tilde{x}_j\}$.

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

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

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

Let's calculate $x_i = \min\{\bar{x}_i, \bar{x}_j, \tilde{x}_j\}$. We have $\bar{x}_i \leqslant \bar{x}_j$ iff $h \leqslant \sqrt{1 - \frac{c}{p - p_{11}}} + \sqrt{1 - \frac{c}{p}}$. We have $\bar{x}_i \leqslant \tilde{x}_j$ 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

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

where $\bar{h}_2$ is the maximum h such that the "proposer works" strategy is feasible. Now $x_i = \min\{\bar{x}_i, \bar{x}_j, \tilde{x}_j\} \leqslant \tilde{x}_j$, 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

$$\text{maximize} \;\; \Pr(s_i + s_j \geqslant 1)(1 + v_i(x_i)) - c$$

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

We can re-write the problem as follows:

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

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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