Delay as Agenda Setting[*]

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Abstract

In this paper we examine a class of dynamic decision-making processes that involve endogenous commitment. Our analysis is relevant to group decision making settings as well as to hierarchical decision making settings in which, for example, subordinates attempt to influence their superiors. An inability to commit leads to the possibility of strategic delay by decision participants who differ in their preferences and are limited by the resources they can allocate to influencing decisions. We focus on sources of delay caused by the strategic interaction of decision makers over time and find that the opportunity to delay decisions leads the participants to sometimes act against their short-run interests. Two classes of activity of this type emerge which we refer to as *focusing* and *pinning*. We also explore how strategic delay alters the benefits from agenda setting.

1 Introduction

In 1974, amid pressure from the Watergate scandal which ultimately scuttled his presidency, an embattled Richard Nixon proposed a comprehensive national health insurance plan in his State of the Union address. Nixon's backing meant national health care insurance legislation had bipartisan support and a real chance for passage; but Nixon was unable to craft a compromise with the Democratic

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opposition and a plan was never passed.[1] Some cynics interpreted Nixon's proposal as a strategic move: "struggling to distract a Democratic Congress from the Watergate crisis, Nixon offered national health insurance as a last-second bargain to save his Presidency." (Light 1991; p. 256) [13]. The timing of formal administration support coupled with the attractiveness of the bill to the Democrats, gives credence to this cynical view. If the Democrats wanted to make a real push for health care insurance legislation they needed to focus legislative attention on health care and they needed the support of the Republican administration. To achieve this, action on Watergate would likely have to be delayed and would certainly have been reduced in intensity. Delay could have saved Nixon's presidency.

While delayed action and deferred decisions rarely involve the toppling of a president, delay is ubiquitous in politics, business, and personal life. Delay itself is representative of a class of decision problems involving endogenous commitment. The defining feature of such problems is that decisions vary in terms of their associated degree of commitment. Fully funding a project, for example, entails a long-term commitment, whereas deferring the funding decision involves no commitment.[2] In the latter case, the decision becomes considered along with subsequent decisions. Unresolved decisions change decision makers' allocations of attention and influence activities going forward and open up important dynamic channels for indirectly influencing outcomes of subsequent decisions by altering the likelihood that a decision remains active. In this paper we explore the strategic use of resources which operate through this dynamic channel.

[1] National health care insurance legislation was more attractive to the Democratic party than the Republican party, though Nixon had been a supporter as well. The leading Democrat pushing for national health care insurance plan was Ted Kennedy who had run for President in 1972. It has been reported that the 1974 failure to pass a national health care insurance plan was Kennedy's "biggest regret." (Washington Post, August 28, 2009)

[2] A failed proposal that can be reintroduced is another example of a decision that lacks commitment. The U.S. legislative process with its strong status quo bias and the ability of lawmakers to reintroduce previously failed bills comes to mind. But such a setting is not uncharacteristic of decision making in the firms too where, for example, rejected proposals of subordinates are sometimes quietly maintained in hope that circumstances or some success will allow the proposal to be revisited. Burgelman (1991) [6], for example, chronicles an instance at Intel where the RISC processor was kept alive despite the company's explicit strategy of not pursuing such a processor. While our focus is on decision making "on agenda," the model can also be used to explore the dynamics of whether a decision gets on the agenda in the first place. Decisions that do not make it on the agenda have not been officially killed and can therefore be interpreted as "delayed." Observers of decision making in organizations note the importance of this silent use of power. See, e.g., Pfeffer 1981 [21].

Commitment-avoiding strategies are strategically valuable because they shape the actions of the other decision makers. Consider, for example, the implications of complete inaction, the most extreme form of commitment avoidance. If no action is taken, the decision at hand is deferred and remains on the agenda, leading decision makers to alter their allocation of influence resources. When the decision is of great consequence to a rival, deferring that decision has the effect of pinning that rival's resources to the carryover decision. This is good, if the rival would otherwise use her resources in opposition to the focal decision maker. This can also be bad, if the rival would be an ally. We analyze the mechanism through which these limited commitment effects work and characterize the preferences under which a decision maker will act against short-term self interest to gain the strategic benefits of reducing or increasing commitment to a decision.

Our base model provides a simple structure which isolates the effect of commitment while allowing considerable range for endogenous interaction. We abstract from the specifics of various decision structures and build a spartan strategic ark involving two players, two decisions, and two periods. Each player allocates a fixed per-period stock of resources (influence or attention) over the available decisions in accordance with the player's particular preferences and the anticipated strategic interaction. Two periods is the minimal time structure that can capture the effects of inaction, two players is usually thought of as the fewest number needed for strategic decision conflict, while two decisions are needed to provide for allocation of attention. In the first period one of two unrelated decisions is under consideration. The other decision is considered in the second period. In the first period, the decision is whether or not to make a long-term commitment to a proposal. If no commitment is made, then that proposal is deferred to the second period where it is considered along with the other proposal. In the second period all proposals on the table are permanently resolved. In each period players simultaneously allocate their influence resources for or against each available decision. The allocation of these resources and some exogenous environmental parameters determine the decision outcome. For example, opposing influence activities in the first period increases the probability of inaction, whereas reinforcing action decreases that probability. Players maximize their undiscounted two-period payoffs which are based on their preferences regarding outcomes of each decision. Resources are assumed to be renewed each round. There is no cumulative effect over the periods, and resources from one round cannot be used in another round. We model the strategic interaction as being played under conditions of complete information.

We find that the opportunity to keep a decision from being permanently resolved leads the agents to split their resources differently than they would in a single-period setting that lacks a dynamic link between periods and hence decisions. Two main tactics emerge that we refer to as *pinning* and *focusing*. An important determinant of this allocation is the relative alignment of competitor preferences.

The pinning incentive increases with asymmetries in preferences but does not necessarily require conflict. In equilibria characterized by pinning, one player expends first-period resources against interest to reduce the probability that a long-term commitment is made (and hence that the decision will leave the agenda). The "pinning" player is willing to do this when the decision is of minor importance to him but is important to the other player. By taking this action, that player *pins* an additional amount of the other player's resources on her key decision, leaving less resources for the other player to fight the pinning player on the other decision.

Examples of pinning behavior are common in decision making settings. Kingdon (1984, p.185) [11] in discussing the policy arena notes that "...strategists sometimes deliberately overload an agenda to frustrate all action. If they want to prevent action on a particular item, they load in many other items to compete." Light (1991) [13], as discussed above, suggests that Nixon tried to use his national health insurance proposal to divert Congressional attention away from Watergate.[3] The opening of a second front through pinning also occurs in market competition settings where, for example, one firm spends resources in a market important to the firm's multi-market business. MacMillan, van Putten, and McGrath (2003) [15] call this class of tactics feints in which an attack in one market diverts resources from another market. Among other examples, they describe how Philip Morris attacked R.J. Reynold's U.S. position in premium cigarettes which diverted RJR's resources away from Eastern European markets that were of great interest to Philip Morris. The market examples lack the explicit timing of issues that characterizes decision making processes since competition across markets occurs concurrently. However, when viewed through a commitment lens, market outcomes can lead to long-term shifts in the nature of competition in the market (e.g., if one firm withdraws from a market, the incentives for ongoing investments in that market have changed) and firms may

[3] In terms of our base model, Nixon's State of the Union support can be viewed as keeping national health insurance on the active legislative agenda, thereby pinning strong NHI supporters to this issue and away from impeachment. An alternative bargaining interpretation of Nixon's gambit would need to have a mechanism for enforcement. Pinning resources provides one incentive compatible mechanism for enforcing such an implicit bargain.

therefore change the allocation of their resources across all markets. Essentially, any outcomes that alter the long-term nature of competition in one market can be thought of as commitments to a new competitive situation.

If avoiding commitment is sometimes valuable, then it follows that seeking commitment would also sometimes be valuable. Then, instead of delaying the permanent resolution of the earlier decision, it is optimal for a player to decrease the likelihood of delay to free the rival's resources for use on the later decision. This dual to pinning, which we refer to as *focusing,* requires that the focusing player and the rival player have aligned preferences on the later decision. As an example of a strong form of focusing, one player sometimes finds it optimal to support the other player's efforts to get the initial proposal accepted, even though that player opposes the proposal. This tactic works by getting the contentious decision off the agenda so that focused player in the following period will spend all of her resources on the remaining decision over which both of the players' interests are aligned. Effectively, the focusing player sacrifices one decision outcome to *focus* the other player's attention and resources on the other decision. Focusing has the nice feature of avoiding the use of resources which neutralize each other and provides a time-consistent explanation for logrolling which does not rely on reputations or other outside-the-immediate-interaction considerations.[4]

The underlying model can be used to assess the value to an agenda setter of reordering the sequence in which decisions are considered across meetings. The order is most interesting when the players have strong relative preferences. In our partial conflict setup, for example, placing the issue (Y) over which there is agreement first would appear to benefit the Y-centric player who has strong relative preferences for passing Y. When Y is first, Y receives the undivided resource attention from both players in the first period and, if the decision remains unresolved, it can still be attended to in the second period. However, when the other player has a strong relative preference for X, the other issue, that player will be induced to pin the Y-centric player when Y is first and keep issue Y on the agenda. This pinning incentive is increased as the Y-centric player's relative preference for Y increases. Under some conditions, the cost of being pinned and the benefit from being able to focus its rival cause the Y-centric A to prefer to keep decision Y second. This order is always the strong preference of the rival. The relative strengths of preferences are key to understanding when pinning and focusing

[4]There are also market examples which are consistent with focusing. For example, in an action described as a "reverse feint," MacMillan, van Putten, and McGrath (2003) [15] describe how Gillette, by withdrawing from the disposible lighter market, induced Bic to focus on that market and pull resources out of disposible razors.

obtain and our analysis provides the machinery to characterize the value of reordering the agenda to each player (which we do for the interesting case where preferences would lead to either pinning or focusing depending on the agenda order). Finally, while we do not explore how decision making can take place via bargaining among the participants, our results provide a different perspective on the threat points that are essential to predicting bargaining outcomes. For example, the decision outcomes associated with short-run self-interested action does not provide an appropriate set of threat points when there are strong relative preferences and some underlying conflict.

Little, if any, work has analyzed the effects of attention and endogenous commitment on organizational decision making with closed-form analytical models. Our analysis connects research on influence activity and agenda setting. The influence activity models of Milgrom and Roberts (1988 [17], 1990 [18]) focus on the design of incentives to agents who, given the incentive structure, optimally split their time across current production and influence activities that impact all of the players' payoffs. Our interest in endogenous commitment and their interest in organizational design lead to quite different models: we build a dynamic model to explore deferred decisions, but do not address various optimal organizational designs that could structure the nature of the intra and inter-period decision-maker interactions. We take such design elements as inherited and see the elements as emerging from a much wider range of problems than contained within the scope of our model.

A wide range of agenda setting models have been analyzed in the economics and the formal political science literatures (see, e.g. Plott and Levine 1978 [22], List 2004 [14]). While we explore some consequences of the ordering of decisions, our focus is not primarily on how an agenda can be optimally managed by an agenda setter, but is on how the agenda is altered as the result of strategic choices and their ensuing direct decision consequences. Generally, agenda-setting models focus on the ordering of decisions which is particularly interesting when decision payoffs and outcomes are linked across decisions. Our focus is on the impact of deferred commitments on the allocation of influence (or attention) which does not require any outcome or payoff link across decisions. One way to think of the difference is that we focus on across-meeting issues whereas most of the agenda setting literature has a within-meeting focus.[5]

Finally, "Colonel Blotto" games share with our game a concern with how a fixed set of resources

[5] By "within meeting" we are including a series of decisions that may take place over separate meetings but which have no allocation of resources or acquisition of information (other than the results of previous decisions) that will influence outcomes.

are split across two or more decisions (battlefields). Our model differs from the original Colonel Blotto zero-sum game and extensions of the game to more general payoffs in at least two major ways: our game is dynamic with renewed resources as opposed to being static and in our game the players, unlike in the Blotto game, are not necessarily in direct opposition to each other. Thus, the Blotto games do not admit of efforts to further an opponent's cause, in order to get the opponent to further your cause, such as what we observe in our focusing equilibria. For some recent treatments of the Colonel Blotto game see Roberson (2006) [24] and Golman and Page (2006) [10].

In the next two sections we develop our basic endogenous commitment model and then analyze it. Section 4 discusses which combination of preferences leads to pinning and to focusing and then characterizes the conditions under which an order that involves pinning is preferred to an order that involves focusing. In Section 5 we provide some background about decision making from the organizations literature and discuss how our results may apply to range of other decision making settings. Section 6 examines a symmetric model of decision making as a check on the robustness of the basic results and Section 7 concludes.

2 Model

Our model consists of two players, A and B, who independently allocate their attention to influence the outcomes of two unrelated proposals, X and Y. There are two periods over which the decision can be made. The first period begins with only proposal X on the decision agenda. Proposal Y is added in the second period.

Proposals X and Y are assumed to be fixed in content. The allocation choices over X in the first period result in the proposal being accepted or delayed to the second period. In the second period the allocation choices result in proposals being either accepted or rejected. Player A has a utility u_X when proposal X is accepted and u_Y when proposal Y is accepted. Player B's utilities upon acceptance are similarly represented by v_X and v_Y. We normalize the utility given the rejection of a proposal to 0, hence the acceptance utilities are more precisely viewed as the incremental utility or disutility of accepting versus rejecting the proposal. The utility associated with each proposal is assumed independent of the outcome of the other proposal. To simplify, we also assume no discounting and that the preferences of each player are known to the other player.

In each period a player has a fixed amount of attention (resource) that she can allocate to influence the outcome of the proposals so as to maximize the undiscounted two-period sum of her expected utilities. Rather than model allocation of attention directly, we instead treat each player as choosing probability influence increments. For example, when both proposals are on the agenda, player A chooses probability increments a_X and a_Y and B chooses b_X and b_Y. When only proposal X is on the agenda, A only chooses a_X while B chooses b_X (similarly for Y). A player supports a proposal when she chooses a positive probability increment and is opposed when she chooses a negative increment. We assume that each player's allocations have a direct effect which is linear and additive. In addition to being easy to calculate, this structure has the advantage of isolating the across-period strategic effects as additivity eliminates single-period strategic interaction. Influence is neither cumulative nor storable across periods. Thus, if proposal i is on the agenda, the probability the proposal is accepted is

$$p_i = z_i + a_i + b_i \tag{1}$$

where z_i is a shifter that captures exogenous factors that affect the probability of acceptance.[6] We differentiate actions taken in the first period from those taken in the second period by using lower case as opposed to upper case proposal-identifying subscripts. Thus, a_x and a_X are, respectively, player A's first and second period allocations on issue X.

To capture the notion that total influence is bounded in a multi-issue setting, we assume that there is a probability influence frontier g:

Condition 1 *Influence choices must satisfy* $|a_y| \leq g(|a_x|)$ *for* $a_x \in [-\bar{p}, \bar{p}]$, *where the probability frontier* g *satisfies (i)* $g(0) = \bar{p}$, *(ii)* $g(\bar{p}) = 0$, *(iii)* g *is symmetric around* 0: $g(a_x) = g(-a_x)$, *(iv)* g *is symmetric around the* $45°$ *line:* $a_y = g(a_x) \Leftrightarrow a_x = g(a_y)$, *(v)* g *is decreasing and concave over the interval* $[0, \bar{p}]$, *and (vi)* $g'(0) = 0$ *and* $g'(\bar{p}) = -\infty$.

Intuitively, this is a resource constraint with the maximum probability influence on a single issue equal to $\bar{p}$. The assumed properties for the frontier can be derived as endogenous properties for an underlying model of effort choice in which additional effort yields a diminishing marginal effect on probability and the agent is equally effective at influencing one issue or the other. We can relax these assumptions, whenever desired, by examining the limiting cases of a straight-line resource constraint or a right-angle one (these will often yield corner solutions for influence allocation). The advantage of

[6] For example, in a hierarchical setting involving two subordinates who try to influence a superior, one can think of z as the superior's initial bias on the decisions at hand.

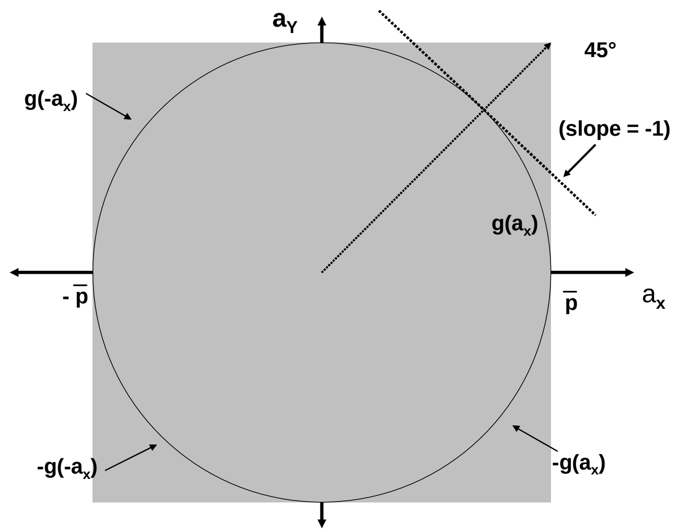

Figure 1: Influence 'Circle'

the frontier structure embodied in g is that influence allocation choices in a multiple issue setting are always interior to the interval $(\bar{p}, \bar{p})$. We can see this in the figure, which illustrates choices relative to the "influence circle." Of course, the region in the figure in not literally a circle (except in the special case of $g(a) = \sqrt{\bar{p}^2 - a^2}$ which we will employ in our examples). Depending on whether the player wants to support or oppose issues, we will always be able to characterize the choices in terms of a tangency between the influence circle and a benefit ratio.

In general we focus on interior settings where players do not have resources that are sufficient to remove all uncertainty: for any choices (a_X, a_Y) and (b_X, b_Y), we have interior probabilities p_X and p_Y. The following condition is assumed to prevent corners when only one issue is on the agenda.

Condition 2 *Assume that $2\bar{p} < z_i < 1 - 2\bar{p}$ for $i = X, Y$ (feasible influence choices never lead to deterministic outcomes)*

In the first period there is no reject possibility, so the probability of deferring commitment on the proposal (i.e. delay) is $1 - p_x$. In the second period, there is no delay state, so the probability of a rejected proposal i is just $1 - p_i$. Restricting the first period outcomes to either accept or delay simplifies the analysis, allowing us to obtain more powerful and transparent results and to analyze active agenda setting.[7]

2.1 The Static Equilibrium Benchmark

We begin our analysis by considering the optimal actions for the players in the second period. This analysis provides both a building block for the dynamic analysis and a benchmark setting in which strategic interaction is eliminated between players A and B.

The optimal actions for players in the second period depend on whether issue X was delayed from period 1. We begin with the simplest case of one issue Y where each player's payoff (u_Y for player A and v_Y for player B) for acceptance is positive so that the players have common interests over Y. The probability of Y is given by

$$p_Y = z_Y + a_Y + b_Y \tag{2}$$

where $z_Y > 0$ is an exogenous shift effect and players A and B can influence the probability of Y by choosing a_Y and b_Y, respectively, and where each choice is an element of $[-\bar{p}, \bar{p}]$. Given the linear structure of the influence probabilities, z plays an inessential role regarding incentives, but is included for convenience to avoid nonnegative net influence probabilities.[8] Assume that $2\bar{p} + z_Y < 1$ and $z_Y - 2\bar{p} > 0$ (Condition 2 above) so that the trivial case of a certain outcome is not possible. Clearly, each player will choose $\bar{p}$ so that the chance of Y occurring is maximized (this is a dominant strategy with $u_Y > 0$ and $v_Y > 0$). The resulting payoffs associated with Y are then given by

$$\begin{aligned} U_Y &= u_Y \left(z_Y + 2\bar{p}\right), \\ V_Y &= v_Y \left(z_Y + 2\bar{p}\right). \end{aligned}$$

Of course, if the players have opposing interests, then they will take offsetting actions. Suppose that $u_Y < 0 < v_Y$. Then, we can apply the above choice framework and the only change is that we now have $a_Y = -\bar{p}$, so that player A tries to minimize the chance of Y occurring. The outcome is that the influence choices now cancel each other and result in payoffs

$$\begin{aligned} U_Y &= u_Y z_Y, \\ V_Y &= v_Y z_Y. \end{aligned}$$

[7] When there is only one issue in the first period, we do not have to worry about the tradeoff between issues that is associated with the g function and relative expected payoffs to each issue.

[8] It might be interesting to explore how a z interaction with a and b would affect choices.

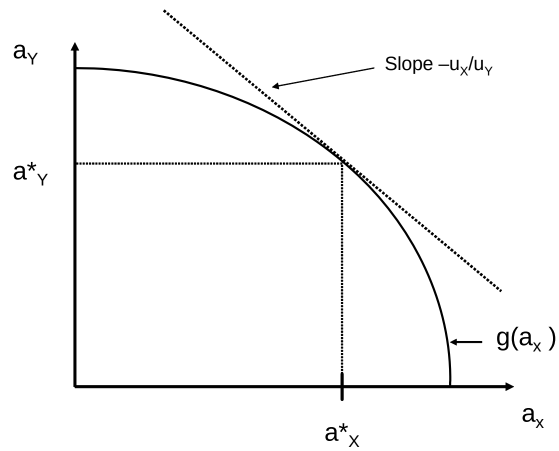

Figure 2: Optimal Static Influence Levels

Now consider 2 players, A and B, and 2 issues, X and Y; that is, issue X had been delayed from the first period. We begin with the simplest case where both issue payoffs are positive for each player. Thus, $u_X > 0$ and $u_Y > 0$ for player A and $v_X > 0$ and $v_Y > 0$ for player B. We solve for a Nash equilibrium where each player chooses their own probability influence on each of the two issues.

Given an influence choice by player B, say b_X and b_Y, player A's problem is to choose influence levels to

$$\max_{a_X, a_Y} u_X \left[z_X + a_X + b_X \right] + u_Y \left[z_Y + a_Y + b_Y \right]$$

for feasible influence levels relative to the probability frontier, $a_Y = g(a_X)$ for $0 \leq a_X \leq \bar{p}$ (negative influence levels are never optimal in this case). Since the actions of player B only have an additive effect on this payoff, just as the exogenous z effects do, the optimal choice by player A is given by

$$-\frac{u_X}{u_Y} = g'(a_X^*) \tag{3}$$

on issue X and $a_Y^* = g\left(a_X^*\right)$ on issue Y. See Figure 2.

Similarly, player B chooses influence levels given by

$$-\frac{v_X}{v_Y} = g'(b_X^*) \tag{4}$$

on issue X and $b_Y^* = g\left(b_X^*\right)$ on issue Y. Thus, the static benchmark has no strategic interaction between the players. Precisely because the other player's action does not impact the marginal benefit of one's own action, the two players optimize independently of each other. This is just as it was in the single issue case although there each player is always at a corner solution.

Critically, however, a player's payoff does depend on the actions of the other player. This is the channel for generating dynamic strategic effects in our model. Anticipating that in the future another player will support or oppose an issue that remains unresolved, there is an incentive to take action today to influence the other player's future move. To analyze this channel, we need to calculate the payoff outcomes for the simple static Nash equilibrium:

$$\begin{aligned} U_{XY} &= u_X\left(z_X + a_X^* + b_X^*\right) + u_Y\left(z_Y + a_Y^* + b_Y^*\right), \\ V_{XY} &= v_X\left(z_X + a_X^* + b_X^*\right) + v_Y\left(z_Y + a_Y^* + b_Y^*\right). \end{aligned}$$

When the players' interests are not perfectly aligned across issues, one or more payoffs are negative. A small variation on the above analysis provides the benchmark outcome. Suppose that $u_X < 0 < u_Y$ for player A while player B continues to favor both issues. Clearly, player A will want to reduce the likelihood of X. Thus, we view $-a_X \in [0, \bar{p}]$ and the previous formulas are modified to

$$\frac{u_X}{u_Y} = g'(-a_X^*) \quad \text{and} \quad a_Y^* = g\left(-a_X^*\right) \tag{5}$$

so $a_X^* < 0$. Payoffs for the two players are then given by the above formulas for U_{XY} and V_{XY}, as the sign of each influence choice will reflect the payoff effect. Other combinations of player interests are obtained as straightforward variations.

Note that we have found a Nash equilibrium for the static game. This is because when each player chooses optimally, (a_X^*, a_Y^*) by A and (b_X^*, b_Y^*) by B, we have an outcome where each player is at a best response to the other's choice. More precisely, each player's choice constitutes a dominant strategy. The absence of strategic interaction in the static game makes it possible to isolate the dynamic structure as the driving force behind the emergence of strategic effects.

Summarizing the above discussion and analysis, we have:

Lemma 1 *Let* $u \equiv \left|\frac{u_X}{u_Y}\right|$ *and* $v \equiv \left|\frac{v_X}{v_Y}\right|$ *denote the preference intensities. Then, the strategies in the static Nash equilibrium when* X *and* Y *are on the agenda are given by*

i) $g'(|a_X|) = -u$ *and* $g'(|b_X|) = -v$

ii) $g(|a_X|) = |a_Y|$ *and* $g(|b_X|) = |b_Y|$

iii) $sgn(a_i) = sgn(u_i)$ *and* $sgn(b_i) = sgn(v_i)$ *for* $i = X, Y$.

Note that the Lemma characterizes the optimal choices in terms of magnitude, parts (i) and (ii), and then sign, part (iii). Solutions are always on the boundary of the influence circle, as in (ii), since any unused influence can always be profitably directed to changing an issue probability. The magnitude of a choice depends only on the preference intensity, as in (i), where the probability trade-off and utility trade-off between X and Y are equalized. The sign of a choice always follows the sign of the utility effect, as in (iii).

We will always denote the optimal static choices by (a_X^*, a_Y^*) and (b_X^*, b_Y^*), for which the sign is implicit. On occasion, however, it is more convenient to have a version where the sign is explicit. Thus, we let $a_X(u)$ and $a_Y(u)$ denote the unique solution, at an arbitrary $u \geq 0$, to the first-order conditions, $g'(a_X) = -u$ and $g(a_X) = a_Y$, and similarly for $b_X(v)$ and $b_Y(v)$. These are always positive and can be applied directly to the various cases for preferences. For example, when $u_X < 0 < u_Y$, we have $a_X^* = -a_X(u)$ and $a_Y^* = -a_Y(u)$. Finally, note that $a_X'(u) > 0 > a_Y'(u)$, as is easily verified, so that as u rises more influence is allocated to X and less to Y since X is more important and Y less so with a higher u intensity.

2.2 Dynamic Equilibrium Choice

The optimal static equilibrium strategies given by Lemma 1 are also the optimal second period equilibrium strategies. We now turn our attention to an analysis of the first-period actions.

From our benchmark analysis of the static case, we have the continuation payoffs for the players and probabilities for period 2 across the two possible states according to whether proposal X was delayed to the second period. The probabilities of each state are given by:

$$\begin{aligned} &\{Y\} \quad \text{with } p_X, \\ &\{X, Y\} \text{ with } (1 - p_X). \end{aligned}$$

The payoff for player A at a candidate set of period 1 choices is then given by the sum of the expected period 1 and 2 payoffs:

$$U^a \equiv (z_X + a_x + b_x)\left[u_X + U_Y\right] + (1 - (z_X + a_x + b_x))U_{XY} \tag{6}$$

Similarly, for player B we have

$$V^b \equiv (z_X + a_x + b_x)\left[v_X + V_Y\right] + (1 - (z_X + a_x + b_x))V_{XY} \tag{7}$$

The incentive for player A for allocating influence in period one is:

$$\frac{\partial U^a}{\partial a_x} = u_X + U_Y - U_{XY} \tag{8}$$

and similarly the incentive for player B is:

$$\frac{\partial V^b}{\partial b_x} = v_X + V_Y - V_{XY} \tag{9}$$

Characterization of the best responses of each player and the equilibrium strategies require additional structure regarding preferences. In the next section we propose a set of generic conflict and agreement settings which we analyze.

3 Player Preferences and Strategic Delay

The advantages and disadvantages of deferring a decision depend on the nature of conflict between the two players in the model. There are three canonical settings regarding the direction of conflict: *pure conflict* where the players have opposed preferences over both issues, *pure agreement* where the players preferences are directionally aligned, and *partial conflict* where the players' preferences align on one issue, but conflict on the other. Within these situations, of course, there is a wide range of variation regarding the relative intensities of conflict or alignment.

Each player has preferences over the two issues X and Y that can be categorized into whether the player is for or against the issue. In terms of conflict, there are many directional preference combinations, though many of them do not differ in any economically material way.[9] Our analysis focuses on partial conflict settings which we believe lead to the most interesting strategic interactions. Then we briefly extend our analysis to characterize similar interactions that occur in pure conflict and pure agreement settings.

3.1 Partial Conflict and Focusing

In a partial conflict setting, players agree on one proposal but disagree on the other. The strategic dynamics of the *partial conflict* setting can be captured with player A and player B in conflict over issue X, but in agreement over issue Y. We assume this preference relationship throughout the analysis

[9] There are four cases of pure conflict preferences (e.g., $u_X > 0, v_X < 0; u_Y > 0, v_Y < 0$), four in which there is no conflict, and eight with partial conflict (e.g. $u_X > 0, v_X > 0; u_Y > 0, v_Y < 0$).

of partial conflict but we will need to examine both orderings of the issues to illustrate both focusing and pinning. An $X \to Y$ agenda is one in which issue X precedes issue Y and a $Y \to X$ agenda has the order of the issues reversed.

Case 1 ***Partial Conflict*** *$X \to Y$ **agenda:** $v_X > 0 > u_X$, $u_Y > 0$ and $v_Y > 0$.*

The first step of the analysis is to determine the optimal second-period allocations of attention. Using the static benchmark analysis above, if only Y is on the second-period agenda, then $a_Y = b_Y = \bar{p}$, so $U_Y = (z_Y + 2\bar{p})u_Y$ and $V_Y = (z_Y + 2\bar{p})v_Y$. If the agenda includes both X and Y, then a^*_X and a^*_Y and b^*_X and b^*_Y are given by applying Lemma 1 with appropriate adjustment of signs. Then $U_{XY} = u_X (z_X + a^*_X + b^*_X) + u_Y (z_Y + a^*_Y + b^*_Y)$ and $V_{XY} = v_X (z_X + a^*_X + b^*_X) + v_Y (z_Y + a^*_Y + b^*_Y)$.

The next step is to analyze the first-period optimal allocations. The linear structure of influence implies that the objective function for players A and B are maximized by allocating all influence on issue X if and only if $u_X + U_Y - U_{XY} > 0$ and $v_X + V_Y - V_{XY} > 0$, respectively.[10] See (8) and (9). We use these relationships to determine the optimal first-period allocations.

Lemma 2 *Suppose that $v_X > 0 > u_X$, $u_Y > 0$ and $v_Y > 0$. Then player B's optimal first period allocation b_x is $\bar{p}$.*

Under the assumed preferences, Lemma 2 shows that B's long-run interest coincides with B's static interests. If B were to use negative influence, she would increase the probability that issue X will be delayed rather than passed in the first period, which is costly. The effect in the second period would also be negative as there would now be a higher probability that both X and Y are on the agenda. Since A is against X, in the second period A would fight against B in the second period on issue X and use less of his attention on issue Y over which their interests align.

Now consider the first-period choice faced by player A. A has a direct incentive to go negative against X in the first period since that effectively reduces the likelihood that X is accepted (in the first or second periods). However, if X is off the table in the second round, player B will allocate all of its attention to the remaining issue Y which both agree on. This incentive to *focus* player B's attention on issue Y may be optimal if A's intensity of preference is greater for issue Y than issue X.

[10] The easy-to-analyze corner solution is a benefit of restricting the first-period agenda to a single issue. With multiple first-period issues we would have to consider efficiency allocation tradeoffs based on the production function (g function) of effectiveness.

Definition 1 *(Focusing) A player focuses his rival on proposal j when the player's first-period allocation on i is greater than his static optimal allocation.*[11]

Intuitively, the incentive to focus depends not only on A's relative intensity of preference of Y compared to X, it also depends on the incremental gains A obtains from B through shifting B's attention from both X and Y to only Y. If, for example, B also cared much more about issue Y than issue X, the gain to focusing B on issue Y would not be great, as B would have been relatively focused on Y regardless. This logic suggests that the incentives for focusing can be fruitfully characterized as a function of the ratios of the preference intensities for X to Y. As a convention we will measure the preference ratio for each player as positive numbers, i.e., $u \equiv |u_X/u_Y|$ and $v \equiv |v_X/v_Y|$.

Proposition 1 *Suppose that $v_X > 0 > u_X$, $u_Y > 0$ and $v_Y > 0$. For any preference ratio v for player B, there exists a focusing cut-off preference ratio $\overline{u}_F$ below which in equilibrium it is optimal for player A to choose $a_x = \bar{p}$ and above which $a_x = -\bar{p}$. (See Appendix for Proofs)*

Proposition 1 establishes that there is always a region of preferences for A and B in which A will choose to focus player B. In this region, the focusing player will help its rival to accept a first-period issue that the focusing player dislikes in order to get the rival to focus its entire attention on the second-period issue over which the two players have aligned preferences. An extreme case of focusing would occur where B's preference ratio is very large–that is B cares quite a bit more (relatively) about issue X being accepted than issue Y being accepted, while A's preference ratio is very small. In this extreme case B will allocate very little attention to issue Y if both issues X and Y are on the agenda in the second period. By helping to remove X, player A increases the probability that only Y will be on the agenda in the second period and, hence, that B will devote its entire attention to Y, the issue that player A cares about the most.

The incentive for A to focus B depends on both the intensity of preference A has for its key issue (Y) and the relative gain A gets from focusing–the difference in the payoff to the Y only state and the $\{X, Y\}$ state. Because the $\{X, Y\}$ state payoff depends on B's intensity of preference, as v increases B allocates less resources to issue Y in the $\{X, Y\}$ state and hence the benefits to A of focusing increase.

[11] This definition of focusing has the virtue of being simple, but will need to be expanded to accommodate the symmetric model that is described in Section 6.

We now develop an example with a preference structure that we will use in most of the examples throughout the remainder of the paper.

Example 1 *(Integrated Example–$X \to Y$ Agenda): Suppose that resources are traded off according to* $g(a, \bar{p}) = \sqrt{\bar{p}^2 - a^2}$ *with* $\bar{p} = 0.1$, $z_i = 0.2$, *and let the preferences be*

Preference Structure	*Player A*	*Player B*
Issue X	$\boldsymbol{u_X = -0.075}$	$v_X = 1$
Issue Y	$u_Y = 1$	$v_Y = 0.075$

Then the equilibrium allocations will be

Eq Alloc	*1st period*	*2nd* $\{Y\}$	*2nd* $\{XY\}$
Issue X	$\boldsymbol{a_x = 0.1}$	*NA*	$a_X = -.007$
	$b_x = 0.1$	*NA*	$b_X = 0.099$
Issue Y	*NA*	$a_Y = 0.1$	$a_Y = 0.099$
	NA	$b_Y = 0.1$	$b_Y = 0.007$

In this example both players are strongly concerned about the outcome of one proposal, but not the other and the primary focus for one player is the secondary proposal for the other. Thus, the intensity ratio v for player B is large which means that, when faced with both proposals in the second period, B would allocate most of her resources to proposal X. Player A, therefore, receives a large incremental benefit from focusing B on issue Y. Of course, player A's low intensity of preference on proposal X makes it less costly to support proposal X against his static interest. In the example, player A's payoffs increase about five percent through the focusing strategy versus a myopic follow-preferences strategy. However, player B receives a substantial boost from A's focusing strategy: the gain is between two and a half and three times the myopic strategy payoffs.

The following example provides a different preference structure from Example 1 that also generates focusing. Here the focused player (B) has equal preferences over the two proposals and there is an intrinsic bias towards passing both proposals.

Example 2 *Suppose that resources are traded off according to* $g(a, \overline{p}) = \sqrt{\overline{p}^2 - a^2}$, $z_X = z_Y = 0.4$, $\overline{p} = 0.2$, *and let* $u_Y = v_X = v_Y = 1$. *Then* $\overline{u}_F = -0.125$, *so that* $a_x = -\overline{p}$ *for* $u_X < \overline{u}_F$ *and* $a_x = \overline{p}$, *otherwise. Player B chooses* $b_x = \overline{p}$. *If both issues X and Y are on the agenda in the second period, player B splits his effectiveness allocation equally (i.e.* $b_X = 0.14$ *and* $b_Y = 0.14$*) while player A will divide its allocation according to* $a_X = \frac{-u_X}{\sqrt{u_x^2+1}}$ *and* $a_Y = \sqrt{\overline{p}^2 - a_X^2}$.

When one moves from a single issue to a multiple-issue first-period setting, the incentives of the first-period choices strategically interact leading to a more subtle set of incentives than in our base model. The incentive for focusing remains, but it is less dramatic than that forced by our base structure in which optimal first-period choices are cornered. The basic intuition of focusing will also apply, albeit more subtly, to sequential decision settings with more than two issues. We take up this issue in Section 6.

As the relative intensity of player B is increasingly weighted towards issue X, the value of focusing increases because of the difference in how B would allocate its resources towards issue Y in the Y only state versus the X and Y state increases.

Proposition 2 *The focusing cut-off for Player A, $\bar{u}_F(v)$, is increasing in v and satisfies $\bar{u}_F(0) = 0$ and $\bar{u}_F(v) < v$ for $v > 0$. $\bar{u}_F$ is bounded above by $2\overline{p}/(1 - z_X)$.*

Because the payoff to focusing comes from gaining assistance from one's rival in the second period, it seems plausible that preference alignment is a necessary condition for focusing.

Proposition 3 *Focusing can only occur when both players' preferences are aligned over the issue Y that is first introduced in the second period.*

Proposition 3 establishes that preference alignment on issue Y, the issue introduced in the second period, is necessary for a focusing equilibrium. Focusing reduces the probability that issue X will be on the second-period agenda. This increases the probability that the second-period agenda will consist of issue Y alone and decreases the probability of both X and Y together. Alignment over Y makes an agenda with Y alone attractive to the focusing player whereas when there is conflict over Y the Y-alone agenda is relatively unattractive.

Efficiency effects of focusing Focusing is inherently a "cooperative" strategy as the focusing player assists the other player in the first-period anticipating increased assistance from the other player in the second period. We can assess the efficiency of focusing by determining, first, how the focusing equlibrium performs relative to an appropriately-defined social optimum (i.e., the maximum additive social surplus of the players) and, second, whether the focusing equilibrium is Pareto-efficient. A focusing equilibrium cannot reach the welfare optimum (except for trivial cases) because in the second period (given Condition 2) there is always a positive probability of a state outcome in which both issues are on the agenda. In that state, conflict over issue X causes players to expend resources for and against X that wastefully offset each other. A social planner could improve additive social surplus by reallocating those offsetting resources to issue Y over which both players are aligned. Thus, focusing does not achieve social efficiency or Pareto efficiency.

Finally, we can ask how focusing does relative to allocations where both players allocate their resources according to static considerations. Here it is easy to see that focusing is an efficiency improvement versus the static benchmark. Clearly, the focusing player is better off since focusing is an optimal strategy for that player relative to the static resource allocation. The focused player is essentially choosing its static optimal outcomes and all is the same except that the other player is increasing the probability that a favored issue is accepted in the first period. One interpretation of focusing is that it is endogenous incentive-compatible log-rolling.

The analysis of the *Partial Conflict* -$X \to Y$ case illustrates how the dynamic incentives for delay play out in one particular, but important, set of preferences. The analysis extends easily to the case where the alignment on issue Y is reversed (e.g., $v_X > 0 > u_X$, $u_Y < 0$ and $v_Y < 0$) because the marginal benefits from negative influence –leading to rejection–are symmetric with the marginal benefits from positive influence leading to acceptance. It also directly covers the cases where the player labels are reversed.

3.2 Partial Conflict and Pinning

In the previous subsection we explored the impact of partial conflict when the conflict concerned the first issue X. We now consider the $Y \to X$ decision agenda that is exactly analogous to that analyzed above ($v_X > 0 > u_X$, $u_Y > 0$ and $v_Y > 0$), except that the order of the issues X and Y are reversed. Conflict is now over the *second* issue X and issue Y, over which there is directional agreement, is handled first. Note that by Proposition 3 focusing cannot occur with this configuration of preferences.

Case 2 ***Partial Conflict*** $-$ $Y \to X$ *Agenda :* $v_X > 0 > u_X$, $u_Y > 0$ *and* $v_Y > 0$

If player B followed its natural preferences, it would support issue Y in the first period. However, we shall see that dynamic considerations will sometimes cause B to oppose Y in the first period to improve the strategic situation in the second period. Essentially, B works to keep issue Y on the agenda because of issue Y's importance to player A. If both X and Y are on the agenda in period two, A will allocate attention to issue Y which reduces A's ability to effectively oppose B on issue X (over which they conflict). B *pins* A to an issue that A cares alot about.

Definition 2 *(Pinning) A player pins her rival to proposal i when the player's first-period action is less than the player's static optimal action.*

Analogous to the case in the focusing analysis, player B's decision to go against her natural preference depends on the relative strengths of the incentive to accept issue Y and the dynamic benefits of pinning player A to issue Y by delaying it to the second period.

B chooses b_Y to maximize $(z_Y + a_Y + b_Y)(v_Y + V_X) + (1 - (z_Y + a_Y + b_Y))V_{XY}$ where $v_Y + V_X$ captures the value of accepting Y in the first period and V_{XY} the value of delaying Y to the second period. It is clear from the objective function that $V_{XY} > v_Y + V_X$ is a necessary and sufficient condition for $b_Y = -\bar{p}$ (which goes against B's natural preference).

Because there is conflict over X, $V_X = z_X v_X$. V_{XY}, of course, depends on the optimal static allocations (see Lemma 1) which are affected by the relative preference ratios u and v over issues X and Y. Following a similar solution approach as above, we show that there exists a cutoff preference ratio below which pinning is optimal.

Proposition 4 *Suppose that $v > \bar{v}_P(u)$. Then there exists a unique equilibrium and it involves pinning by B: $b_x^* = -\bar{p}$ and $a_x^* = \bar{p}$.*

The key element here is the relative size of the preference intensities. In the proof of the proposition it is shown that $\bar{v}_P(u) > u$ necessarily holds for the pinning cut-off. Thus, existence requires that v is large relative to u. This means that, compared to player A, player B has a stronger preference for X relative to Y. In turn, this relative intensity implies that in the static XY game, the net impact of influence on issue X will be positive and $a_X^* + b_X^* > 0$ holds. In contrast, with X alone the player influences cancel each other. Thus, B has the incentive to 'pin' A by going negative on Y in period 1, acting against (static) interest, to increase the likelihood of delay on Y and keep the issue 'alive' for the second period. Even as $v \to \infty$, so that player B does not care at all about issue Y, B will still have an incentive to affect the outcome associated with Y because of that outcome's resource implications for the outcome of issue X. Thus, one should not be surprised to see influence activity by players over issues that one expects them to care little about.

The benefits of pinning will increase as A places more weight on issue X, i.e., as u increases. This makes pinning more attractive for a wider range of player B preferences. Thus we have

Proposition 5 *The pinning cut-off for Player B, $\bar{v}_P(u)$, is increasing in u and satisfies $\bar{v}_P(u) > u$ for $u \geq 0$.*

Proposition 6 *Pinning can only occur when both players' preferences conflict over an issue that may be alone on the agenda in the second period.*

Proposition 6 establishes that preference conflict on issue X, the issue introduced in the second period, is necessary for a pinning equilibrium. Pinning increases the probability that issue Y will be on the second-period agenda. This decreases the probability that the second-period agenda will consist of issue X alone and increases the probability of both X and Y together. Conflict over X makes an agenda with X alone unattractive to the pinning player.

In contrast to the focusing equilibrium, there is no direct analog of Lemma 2 to guarantee that the other player will always act in accord with preference and support Y. Instead, we find that Players A and B are in a symmetric position with respect to pinning incentives. To see why, consider how $v_Y + V_X$ compares with V_{XY}. We have $v_Y + V_X \lesseqgtr V_{XY} \Leftrightarrow$

$$v_Y \lesseqgtr (a_X^* + b_X^*)v_X + (z_Y + a_Y^* + b_Y^*)v_Y.$$

With respect to Y, the incentive to go positive is unambiguous since 1 always exceeds the probability on the right. For issue X, however, the incentive depends on the preference intensities of both players because these determine whether $a_X^* + b_X^*$ is positive or negative. As we know, if A is strongly dislikes to X relative Y, who also favors X, then this will swing the net influence to $a_X^* + b_X^* < 0$. This, of course, is why B is led to pin A when Y is the more important issue for B.

The same logic, however, applies to A and pinning when u is much smaller than v. Formally, $u_Y + U_X \lesseqgtr U_{XY} \Leftrightarrow u_Y \lesseqgtr (a_X^* + b_X^*)u_X + (z_Y + a_Y^* + b_Y^*)u_Y$. Thus, we find a pinning cut-off for player A of $\bar{u}_P(v)$ and Propositions 4 and 5 apply directly with the relative positions of u and v reversed.[12] For any pair u and v utility preferences intensities, however, at most one of the players will have an incentive to pin since pinning requires that one intensity be sufficiently greater than the other. When the intensities are comparable in magnitude, near the 45° line, both players will follow interest on issue Y in period 1.

We use the same preference structure in Example 1 described above to illustrate pinning in the $Y \rightarrow X$ agenda. In the $Y \rightarrow X$ agenda, player B has the weak preference over the first proposal and, with these preferences, will pin player A to proposal Y in the second period.

[12] We employ notation that identifies which player is pinning, but there is only a single cut-off function. That is, $\bar{u}_P(w) = \bar{v}_P(w)$ for any utility intensity $w \geq 0$.

Example 3 *(Integrated Example–$Y \to X$ Agenda): Suppose that resources are traded off according to* $g(a, \bar{p}) = \sqrt{\bar{p}^2 - a^2}$ *with* $\bar{p} = 0.1$, $z_i = 0.2$

Preference Structure	*Player A*	*Player B*
Issue Y	$u_Y = 1$	$\boldsymbol{v_Y = 0.075}$
Issue X	$u_X = -0.075$	$v_X = 1$

Eq Alloc	*1st period*	*2nd* $\{X\}$	*2nd* $\{XY\}$
Issue Y	$a_y = 0.1$	*NA*	$a_Y = 0.099$
	$\boldsymbol{b_y = -0.1}$	*NA*	$b_Y = 0.007$
Issue X	*NA*	$a_X = -0.1$	$a_X = -0.007$
	NA	$b_X = 0.1$	$b_X = 0.099$

Player B receives slightly more than a five percent increase from pinning versus following a myopic follow-interest strategy. The pinning strategy, however, greatly reduces player A's payoff relative to that which would have been received if B acted myopically.

A pinning strategy is inherently defensive. Therefore, given opposition in the first period on the issue over which both players align, pinning equilibria are not socially efficient. Pinning equilibria are not Pareto-efficient by the same argument used above to show that focusing is not Pareto-efficient. Namely, the second period state when both issues X and Y are on the agenda will involve wasteful offsetting resource use on issue Y. These resources can be reallocated to issue X over which both players align. Finally, unlike the focusing equilibria, pinning equilibria are not Pareto-improving versus static allocations. While the pinning player's expected utility is improved, the pinned player's utility declines.

3.3 Focusing and Pinning with Pure Conflict or Pure Agreement

3.3.1 Pure Agreement

Although focusing (in a $X \to Y$ agenda) requires alignment of preferences over the second issue (Y), it is not necessary that there be conflict over the first issue. This is because the benefits of focusing come from taking issue X off the agenda and is greatest to a player when it has a preference intensity ratio strongly favoring Y while the other player does not. Consider, for example, a preference relationship in which both players are against both issues. If u is small and v is large, an A allocation consistent with static interests would be to delay X by choosing $-\bar{p}$. But by instead choosing $\bar{p}$, issue X is more likely to be accepted and disappear from the agenda, which would lead player B to allocate its entire attention to issue Y.

3.3.2 Pure Conflict

Pinning can also occur in $Y \to X$ settings involving pure conflict. Consider a preference relationship in which player B prefers to accept both issues whereas player A prefers to reject both issues. When, for example, B's preference intensity ratio heavily favors issue X while player A's intensity ratio heavily favors issue Y, it is optimal for player B to act against static interest by delaying issue Y (which is weakly liked) and, by so doing, increase the probability that player A will be pinned to issue Y in the second period, thereby decreasing the force of player A's attention against issue X. It is easy to see how this would work in a limiting case where $v_Y = +\epsilon$ and $v_X >> 0$ while $u_Y << 0$ and $u_X = -\epsilon$. Player B's static optimal action when only Y is on the agenda would be to choose $b_Y = \bar{p}$. We argue that it would be dynamically optimal for B to choose instead $b_Y = -\bar{p}$. As described above, this latter action is optimal when $v_Y + V_X < V_{XY}$. As $\epsilon \to 0$, this inequality becomes $v_Y + z_X v_X < (z_Y - \bar{p})v_Y + (z_X + \bar{p})v_X$ which is clearly satisfied.

4 Decision Order, Payoffs, and Agenda Selection

In the previous section we analyzed the partial conflict case ($u_X < 0 < v_X$, $u_Y > 0$, and $v_Y > 0$) to highlight the dynamic incentives associated with decision delay in a multi-issue setting. In this section we explore which configurations of preferences lead to focusing and to pinning and then we address a set of questions pertaining to the effect of issue order on player payoffs. For example, under what circumstances is it better to begin with the issue that is in conflict as opposed to the issue over which there is agreement? As a bonus this examination provides some initial insight into agenda selection choices.

4.1 Preference Configurations and Strategic Action

Consider the $X \to Y$ agenda in which X is the first issue and Y is the second. Recall that within our partial conflict setting, the players have conflicting preferences on issue X but have aligned preferences on issue Y. Thus, an $X \to Y$ agenda has a structure in which conflict is followed by alignment. By Propositions (3) and (6) we know that an $X \to Y$ agenda will never involve pinning while an $Y \to X$ agenda will never involve focusing.

In this structure of decision making, there is a potential advantage to a player to have his favored issue considered first. By appearing first more resources become available to influence acceptance of that issue relative to the other issue. However, delaying actions called for by dynamic considerations may offset the benefits associated with placing an issue first.

Recall how the incentives for against-interest first-period action are generated. In the second period the decision environment involves either a single issue (because the other issue was resolved in the first period) or both issues (if the other issue was delayed). The single issue state is a liability when the players conflict over the issue, but a possible benefit when there is agreement. For example, when Y is the single issue, the players benefit because their resources reinforce each other compared to the two-issue state in which resources are split according to the players' intensities of preference. A positive expenditure on X in the first period increases the probability of the $\{Y\}$ state relative to the $\{X,Y\}$ state. The incentive to do this depends on the sign of condition (8) $u_X + U_Y - U_{XY}$. When it is positive, the net benefit to a positive expenditure to get the $\{Y\}$ state in place of the $\{X,Y\}$ state leads player A to focus player B. Focusing is possible because of the cooperation inherent in the Y only state. Thus, the shadow of possible cooperation in the second period may induce "cooperation" in the first period by motivating player A to act cooperatively on the otherwise contentious issue X.

Now consider the reverse agenda in which issue Y comes before issue X. If (9), $v_Y + V_X - V_{XY}$, is negative, then player B has an incentive to delay (now first period) issue Y.[13] Under the reverse agenda, the single issue state associated with the second period is the $\{X\}$ state over which players A and B conflict. If B has a strong intensity of preference regarding issue X, she greatly prefers the $\{X,Y\}$ to the $\{X\}$ state and will increase the probability of the $\{X,Y\}$ state through first period pinning actions to delay issue Y. Here, second period conflict undermines the underlying static incentives for first period cooperation.

The incentive to pin depends directly on the intensity of own preferences and indirectly on the intensity of the other player's preference. Player B, for example, has a greater incentive to go against static interest and pin player A, when she has a high v which means that issue X is significantly more important to her than issue Y; the cost of going against interest is low while the absolute benefit from passing issue X is high. But the actual value gained from delaying issue Y and avoiding $\{X\}$ is the relative payoff difference that B obtains between the states. This difference depends on how player A splits its resources in the $\{X,Y\}$ world which, in turn, depends on A's intensity of preference between

[13] It is also possible to have A pin B, but not to have both wish to pin each other at the same time.

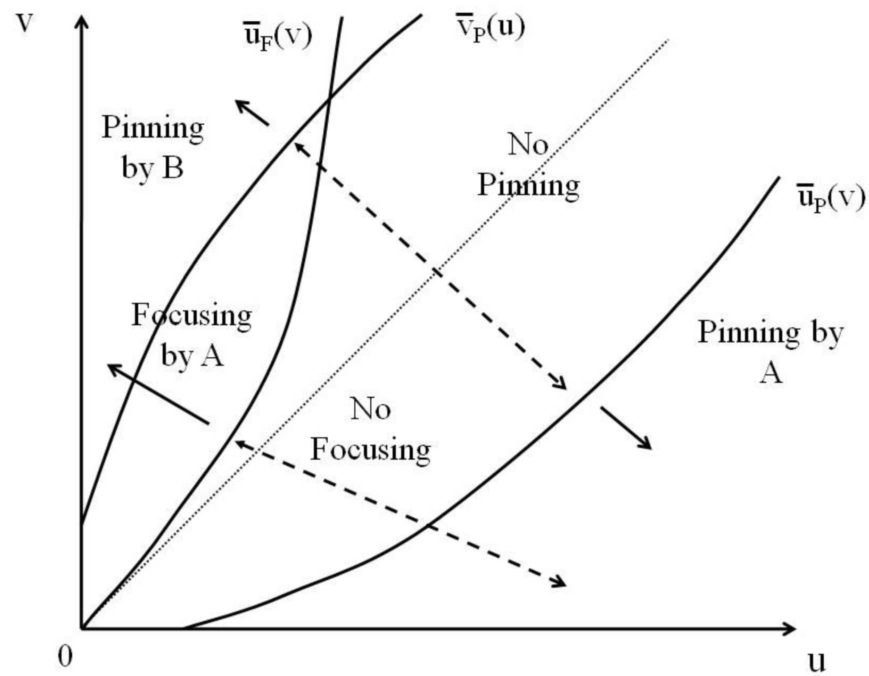

Figure 3: Equilibrium Taxonomy Under Both $X \rightarrow Y$ and $Y \rightarrow X$ Agendas

the issues. Hence, the payoff benefits from pinning indirectly depend on u. The same chain of logic applies to focusing.

Figure 3 locates regions in which different types of equilibria exist under both the $X \rightarrow Y$ and the $Y \rightarrow X$ agendas and under varying combinations of preference intensities. The figure divides the preference space into regions in which focusing and no focusing occur under a $X \rightarrow Y$ agenda. These regions are separated by the cutoff function $\overline{u}_F(v)$ and there are no regions in which pinning occurs (Proposition 3). Also, shown in the figure are the regions in which pinning would and would not occur in a $Y \rightarrow X$ agenda. (Proposition 6 rules out focusing for the $Y \rightarrow X$ agenda.) For the $Y \rightarrow X$ agenda there are three regions: pinning by B (demarcated by $\overline{v}_P(u)$), pinning by A (demarcated by $\overline{u}_P(v)$), and no pinning by either player. Because both A and B have positive static preferences for issue Y, both can pin.

The comparative statics results of Propositions 2 and 5 result are also illustrated in the figure. For example, consider what occurs as u increases, i.e., the importance of issue X increases relative to issue Y. Recall that $u_X < 0$ and that $u_Y > 0$. When u is quite small, player A is likely to focus.

The payoff to focusing, as just discussed, depends on v. As v increases, player B more highly values issue X. Then, B will put an increasing proportion of its resources in opposition to A on issue X in the $\{XY\}$ state which increases the value to A of focusing to reduce the probability of the $\{XY\}$ state. Hence, for higher levels of v, the threshold focusing value of $\bar{u}_F$ increases.

4.2 Preferences and Agenda Control

As depicted in Figure 3 the incentives to pin or focus are greater when each player has more extreme (and opposite) preference intensities. Such preference combinations exist in the upper left portion of the graph where A has a relatively weak preference and B has a relatively strong preference regarding issue X.[14] In this preference region a $X \to Y$ agenda results in pinning by A while a $Y \to X$ agenda results in pinning by B. We now explore this interesting region of preference space to determine how anticipated strategic action affects the ordering preferred by each player.[15]

The question of agenda preference hinges on whether it is better to put the conflict or the alignment issue first. The focusing and pinning equilibria are of interest because the agenda preference will reflect the equilibrium incentives to act against static interest. Thus, A must consider whether it is better to be pinned by B under $Y \to X$ or to focus B under $X \to Y$, and this has several subtle aspects since A must take a costly action to focus B while pinning has B taking action to neutralize A's efforts under pinning. For B, the comparison is intuitively much simpler since the focusing equilibrium has A going against interest to support issue X and this should work to B's benefit.

To compare the two agendas, we need to specify the set of utilities such that in equilibrium we have focusing under $X \to Y$ and pinning under $Y \to X$. This set is given by
$\mathcal{E}_{FP} \equiv \left\{(u,v) \mid v \geq \max\left\{[\bar{u}_F]^{-1}(u), \bar{v}_P(u)\right\}\right\}$. Referring to Figure 3, this set corresponds to the region in the northwest of the graph where is u is relatively small compared to v. At $u = 0$, we know pinning requires a positive v while focusing occurs for all v; hence, the pair $(0, v)$ is in $\mathcal{E}_{FP}$ for every v above $\bar{v}_P(0)$. Since $\bar{u}_F(v)$ has a finite limit as v gets large, the utility set $\mathcal{E}_{FP}$ lies in the northwest region of the graph.

[14] The reason that the lower right part of the figure does not have both pinning and focusing is that "focusing by B" cannot occur because $v_Y > 0$ and, hence, under our preference assumptions, B has a strong incentive to act with interest.

[15] Analysis of the rest of the preference space is generally straightforward, but tedious. It is easy to show, for example, that player A prefers the $Y \to X$ order for the other preference regions with small u, in part because that order creates a situation where A's key proposal is considered by itself.

Proposition 7 *Suppose $(u, v) \in \mathcal{E}_{FP}$ so that equilibrium under the $X \to Y$ agenda has focusing by A and equilibrium under the $Y \to X$ agenda has pinning by B. Then player B always prefers the $X \to Y$ agenda (focusing). Player A always prefers the $Y \to X$ agenda (pinning) if either (i) $z \leq 2/5$ or (ii) $z > 2/5$ and $2\bar{p}(z + \bar{p}) < z(1 - z)$.*

Under the conditions of the proposition, B has a high v (i.e., cares more intensely about issue X than issue Y) and the players conflict over X. Under the $X \to Y$ agenda, issue X comes first, creating a setting with direct conflict between the players. Because A has a low u (i.e., cares more about Y), A will act against interest to focus B by helping to accept X. Under the $Y \to X$, B will pin A. By choosing to pin, clearly, B prefers the payoff associated with the $\{X, Y\}$ second-period state to that associated with $v_Y + V_X$. Then, since the worst outcome for B in the $X \to Y$ agenda is bounded below by the payoff associated with the $\{X, Y\}$ state, a preference configuration that leads B to pin will imply that B will always prefer the $X \to Y$ agenda.

Conditions (i) and (ii) are very mild as it turns out they apply for a large fraction (89%) of the feasible z and $\bar{p}$ parameter configurations. Intuitively, what is needed for A to prefer having the alignment issue come first (being pinned on Y by B) is that full coordinated action on issue Y is not so effective that success is essentially guaranteed in the focusing equilibrium when Y comes second ($z + 2\bar{p}$ is not too close to 1).[16]

To see the effect of various agenda choices in a specific example, consider again the Integrated Examples 1 and 3 that were developed in the previous section. In those examples, the preferences were selected to produce focusing by A in the $X \to Y$ agenda and pinning by B in the $Y \to X$ agenda; Player A strongly prefers issue Y and is weakly against issue X while player B strongly prefers X and weakly prefers Y (with the same relative intensity as player A). The individual payoffs associated with those examples are given in the Table below. For comparison, we also provide the payoffs to a (disequilibrium) myopic set of strategies in which each player merely allocates according to his static self-interest.

Example 4 *Payoffs to Integrated Examples 1 and 3 under $X \to Y$ and $Y \to X$ agendas*

[16] When neither (i) nor (ii) in the propostion applies, there will be small region involving small u and large v where A prefers the $X \to Y$ agenda. As u rises, however, the preference will switch to $Y \to X$. Note, as well, that condition (i) obtains in part because of restrictions on the relative sizes of z and $\overline{p}$ imposed to ensure non-negative probabilities.

Agenda	*Strategy*	A *payoff*	B *payoff*
$X \to Y$ *(Ex. 1)*	*A focuses B*	*0.301*	*0.601*
	myopic	*0.293*	*0.458*
$Y \to X$ *(Ex. 3)*	*B pins A*	*0.425*	*0.307*
	myopic	*0.565*	*0.299*

In both of these examples, the incentives for focusing and pinning for the "strategic" player are modest, but the effects of those actions on the nonstrategic player are great. In the $X \to Y$ agenda the focused player (B) is the big winner. She gets A's affirmative help on her primary issue. Thus, if B is the agenda setter, she will have a big incentive to choose the $X \to Y$ agenda, anticipating that A will act strategically to focus her in the second period. If, for some reason, A chose the suboptimal "myopic" strategy, B still gets a better payoff than it would get under the best $Y \to X$ agenda setting.

What agenda will A choose if he is the agenda setter? The direct focusing analysis above suggested that there is a strong force pushing A to move its greatly preferred issue, Y, to the first period and if B acted in her short-run (myopic) interest, switching the agenda would hugely improve A's expected payoffs. A, however, anticipates strategic pinning by B, yet still prefers the $Y \to X$ agenda because of the exogenous push towards accepting the issue represented by z (which equals 0.2 in the example).

Finally, it should be kept in mind that decision situations are rarely fully malleable to changes in the agenda. Timing frequently reflects some underlying flow of relevant information that provides a natural ordering to decisions and oftentime one proposal is clearer in its likely parameters at an earlier time than other proposals. The comparison of various agenda orders provides some insight into the value of being able to change the agenda or being able to impose costs on those that do.[17]

5 Discussion

In this section we consider how the intuition and results of the model apply to a broader range of settings and, in so doing, address some limitations of the analysis.

Our model applies to settings in which agents that choose to influence decisions (or that make decisions) have limitations in their resources. The most natural limitation for individuals is time and

[17] In principle, one could further augment our analysis with costs of changing the order of the decisions or in delaying or expediting them.

attention which the organizational decision-making literature has emphasized as central to decision making. Simon (1947, p.294) [25] , for example, calls "[a]ttention...the chief bottleneck in organizational activity" and argues that "the bottleneck becomes narrower and narrower as we move to the tops of organizations..."[18] Interest in attention for organizational decision making has also been an important component of more political conceptualizations of organizations such as Pfeffer's (1978) [20] micropolitics model or the organized anarchy (garbage-can) model of March, Cohen, and Olsen (1972).[19] While noting that attention can be augmented by various actions such as buying representation and the like, March and Olsen (1979) [16], for example, see participation in various choice decisions as dependent on organizational obligations, various symbolic aspects of decision making, and rational action regarding the allocation of attention across various alternatives.

> "There are almost no decisions that are so important that attention is assured...The result is that even a relatively rational model of attention makes decision outcomes highly contextual....Substantial variation in attention stems from other demands on the participants' time (rather than from features of the decision under study). If decision outcomes depend on who is involved..., if the attention structures are relatively permissive and unsegmented, and if individuals allocate time relatively rationally, then the outcomes of choices will depend on the availability and attractiveness of alternative arenas for activity. The individuals who end up making the decision are disproportionately those who have nothing better to do..." (pp. 46-47).[20]

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[18] A close look at organizational decisions frequently uncovers the importance of divided attention. Redman (1973) [23] (pp. 55-57), for example, describes how an "amendment in committee" strategy for grafting a National Health Service Corps onto another health bill in 1970 was derailed because of how the U.S. invasion of Cambodia altered the legislative agenda in Congress. "The strategy's demise had been simple enough. While the events of May had occupied the *personal* staffs of the Senators, the *committee* staffs had been insulated from the barrage of visitors and letters...As a result despite the war critics' demands, the committee staffs *had* continued 'business as usual...' the bill that we had planned to amend in committee was no longer there" because it had already been drafted, approved by committee, and sent to the Senate floor. He also discusses (p. 245) how his health service corps bill was saved for a vote because of an unrelated SST filibuster in the Senate which prolonged the legislative session: "Had it not been for the SST filibuster...the two bills would have died that day." Similarly, Wood and Peake (1998) [26] finds that presidential attention to important unresolved foreign policy issues declines when other foreign policy issues become more prominent.

[19] See Eisenhardt and Zbracki (1992) [9] for a review of these perspectives and related empirical work.

[20] See Bendor, Moe, and Shotts (2001) [2] for a critical review of the research program surrounding the garbage-can

While March and Olsen's comment regarding the influence of the idle may be somewhat rhetorical, there is a serious undercurrent in it regarding the use of resources that are non-storable. Our model adopts the starkest version of attention resources: there is no marginal cost of use up to a fixed maximum. One can think of the model as being applicable when the benefit or cost of the less important decision is at least greater than the marginal cost of effort. Because our results are dependent not on the absolute level of value an agent places on the decisions at hand, but rather on the relative levels, this zero marginal cost of use assumption is not particularly limiting. One could alternatively think of the marginal cost of effort as a filter that would limit the number of decisions that are important enough to be under consideration. Lack of storability of resources is natural when one considers attention to be the resource. Many other resources will not have this feature.

We see our model as applying to both decision making by committee and to influence activities within a hierarchical structure. While committee decision making typically involves more than two decision making players, the impact of different preferences on strategic delay actions is arguably captured in our two-player model. In our model a player with unbalanced preferences has an incentive to take a strategic action against short-run interest when the other player also has unbalanced preferences. Players with more balanced preferences have a weaker incentive to take such actions and, hence, would typically take with-short-term-interest actions. More generally, then, one can think of the "other" player's preference as representing the combined (short-run) preferences of all of other committee members.

Consider an extension of the two-player model to accommodate N decision makers each with the same ability to influence outcomes. We conjecture that there are equilibria which involve one player taking a focusing or pinning action while others act with interest. We also believe that the analysis can be extended to show the existence of equilibria where there are multiple players that are taking strategic actions. When expanding from a two player setting to multiple player settings, we have to account for a much more complex preference set. Recall that there are two factors that determine whether a player will focus (or pin): the relative intensity of own preferences by the possibly focusing (pinning) player and the incremental value of such a strategic action relative to the baseline of acting with interest. Incremental value depends on the anticipated actions which will be taken by the other players in the single-issue-only state and in the multiple-issue state. We can propose a multi-player equilibrium and then check deviations by examining the incentives of each player based on their own

model of organizational decision making.

preferences and the "net" actions implied by the equilibrium for the other players. The additive separability inherent in the model's structure helps enormously with this task. Where, for example, N-2 of the players would act with interest in equilibrium and have preferences that completely offset each other, the primary relevant players in the strategic interactions would be the remaining two and the equilibrium strategies developed for those players preferences in the two-player influence game would hold for the multi-player interactions.

The hierarchical decision making setting represents the other extreme in which, political models of organizational decision making aside, a single person is the decision maker. Of course, the ultimate decision maker is still influenced by the actions of subordinates. Under this interpretation actions taken by each of the two players in our model influence the ultimate decision maker. In hierarchical organization settings individuals can be viewed as having differing degrees of participation rights and responsibilities and different levels of information. Players within such structures still have considerable latitude in terms of the influence and attention they choose to give to any given decision. Bower (2005) [3], for example, describes strategy choice as a resource-allocation process in which a firm's strategy is seen as emerging from a decision making system in which upper management primarily controls organizational level decisions such as development of the overall direction of the firm or its culture, but implicitly relies on the judgment of middle managers who compete for resources to fund projects that they believe make good business sense. Decision making from this perspective is seen as "decidedly multilevel and multiperson." (Bower, Doz, and Gilbert 2005, p.13) [4].[21]

Group decision making involving players with different preferences over multiple issues also raises the question of whether bargaining can lead to outcomes that are superior to those produced under decision making procedures underlying our model. Pinning, for example, is not efficient because it involves actions that cancel each other out–there is much room for a Pareto-improving bargain. First, it is useful to note that our focusing equilibrium itself can be interpreted as an incentive-compatible "bargain" in which the focusing player acts against interest to help the other player, who will, as the result of this boost, more likely take actions desired by the focusing player in the following round.

Second, suppose an efficient bargain could be enforced, what would it look like? A first step in most bargaining analyses involves determining the threat points of the bargainers. Based on our pinning and focusing analyses, it is clear that the appropriate threat points cannot be determined

[21] See also William Ocasio (1997) [19] who argues that firm behavior is the result of organizational design which shapes the attention patterns of decision makers.

by looking at the interplay based on each player's optimal single-period action. In fact, analysis of strategic action that leads to focusing or pinning is an essential input to a bargaining analysis.

6 A Symmetric Model of Acceptance, Rejection, and Delay

To increase the transparency of the analysis we chose to focus on an asymmetric decision making setting in which first-period decisions are either accepted or delayed but cannot be rejected outright. While asymmetry is characteristic of a wide range of decision settings, it is useful to determine if the intuition from the asymmetric model is robust to symmetric decision settings where first period rejection is possible and both issues are on the agenda form the start.

To address these questions we modify our $X \rightarrow Y$ agenda model to allow for a symmetric treatment of rejection and a consideration of issue Y in the first period–effectively removing the importance of order from the analysis. We find that focusing and pinning continue to emerge in such settings and that it is possible that both players simultaneously engage in these strategies.

The model structure builds directly on the base model analyzed above. Allowing both issues to be considered in the first period creates a tradeoff in terms of the optimal use of resources because of our assumptions regarding decreasing marginal effectiveness with increased resource use. The other major addition is the how the probabilities of delay, acceptance, and rejection are handled. In the base model we treated delay as the outcome which occurred when an issue was not accepted. To include rejection as well as acceptance, requires that we now model delay and rejection. We allow delay to be generated by the actions of the players and also allow for the possibility that delay may be intrinsic to the decision and exogenous to the actions of the players. Most observers have found a positive correlation between the desire to attain decision consensus and delay. Conflict which makes consensus more difficult would then seem also positively correlated with delay. We treat conflict (as indicated by settings where one player supports the proposal opposed by the other player) as increasing delay and agreement–both players supporting or opposing the proposal–as decreasing delay. These interactions are modeled as a first-period probability of decision delay d_i on proposal i.

$$d_i = z_D - \gamma a_i b_i$$

z_D is the exogenous decision delay probability and γ is a scaling factor for the endogenous delay effect caused by conflict or agreement over issue i. Note that the multiplicative functional form used here implies that agreement reduces delay whereas disagreement increases delay.

This assumption seems particularly appropriate for environments in which decision makers favor some degree of consensus over pure formal authority or adherence to strict voting rules. Pfeffer (1981 [21], p.155) argues, for example, that organizations value consensus because consensus improves implementation prospects and has advantages over the long term. But the push for consensus also can lead to delays in decision making which sometimes ends only when no further consensus seems likely or external timing forces a decision.[22] The positive relationship between conflict and delay is not, however, uncontroversial. Eisenhardt's (1989) [8] study of decision making speed in microcomputer firms found both examples where conflict slowed decisions – where the firms valued consensus–and where it did not. She also notes that CEOs that lack confidence in their own judgment may also slow decisions to gain more information and hear more argument.[23]

In a model that incorporates delay, actions that increase the probability of delay must have corresponding reductions in the probabilities of the other alternatives. This relationship was easy in the asymmetric model as changes were one for one with the probability of acceptance. When there are two non-delay alternatives–accept or reject–the assignment probability effects requires additional assumptions. This assignment is less obvious than it might appear at first consideration. If the probability of acceptance was relatively high to begin with, should that probability be reduced by the same absolute amount as the probability of rejection or should it be reduced proportionately? If the action that led to delay was a negative action, should the increased probability of delay come mostly from reduced acceptance? We model delay as follows: first, with probabilities d_i and $1-d_i$, respectively, either decision i is delayed to the second period or it is resolved. If the decision is resolved, then the proposal is accepted with probability p_i and rejected with probability $1-p_i$.[24]

The optimal static equilibrium strategies given by Lemma 1 are also the optimal second period equilibrium strategies for this symmetric model. We now turn our attention to an analysis of the first

[22] Bucher (1970 p. 45 [5]) "most of the opposition to an idea is worked through...or else the proposal dies"

[23] Bazerman and Moore (2009) [1], p. 50 John Wiley & Sons, discuss research that suggests that group decision making exhibits "bounded awareness" in the senses that information surfaced in group discussion has a much greater effect on the decision outcome than information considered by the individual but not brought up in discussion and that pooling of information suffers in group decision making because of a group's tendency to focus on information previously known to all to the detriment of information known to one.

[24] As the sum of the probabilities of the possible decision consequences must sum to one, this particular acceptance-rejection-delay structure distributes the changes in delay probabilities proportionately across accept and reject outcomes.

period actions.

Because both issues X and Y are now considered in the first period, we have four possible agenda states in the second period instead of the two we had in the base model. The probabilities of each state are given by:

$$\begin{array}{ll} \{\} & \text{with } (1-d_X)(1-d_Y) \\ \{X\} & \text{with } d_X(1-d_Y) \\ \{Y\} & \text{with } (1-d_X)d_Y, \\ \{X,Y\} & \text{with } d_Xd_Y. \end{array}$$

The payoff for player A at a candidate set of period 1 choices is then given by the sum of the expected period 1 and 2 payoffs:

$$\begin{aligned} U^a \equiv\ & (1-d_X)d_Y\left[p_Xu_X+U_Y\right]+d_X\left(1-d_Y\right)\left[p_Yu_Y+U_X\right] \\ & +d_Xd_YU_{XY}+\left(1-d_X\right)\left(1-d_Y\right)\left[p_Xu_X+p_Yu_Y\right] \end{aligned} \tag{10}$$

Recall that delay is due to exogenous and endogenous factors: $d_i = z_D - \gamma a_i b_i$. Similarly, for player B we have

$$\begin{aligned} V^b \equiv\ & (1-d_X)d_Y\left[p_Xv_X+V_Y\right]+d_X\left(1-d_Y\right)\left[p_Yv_Y+V_X\right] \\ & +d_Xd_YV_{XY}+\left(1-d_X\right)\left(1-d_Y\right)\left[p_Xv_X+p_Yv_Y\right] \end{aligned} \tag{11}$$

The incentives for player A for allocating influence across the two proposals are:

$$\frac{\partial U^a}{\partial a_x} = u_X - u_Xd_X + \gamma b_x[-U_X + (U_X - U_Y - U_{XY})d_Y + p_xu_X]$$
$$\frac{\partial U^a}{\partial a_y} = u_Y - u_Yd_Y + \gamma b_y[-U_Y + (U_X - U_Y - U_{XY})d_X + p_yu_Y]$$

and similarly the incentives for player B are:

$$\frac{\partial V^b}{\partial b_x} = v_X - v_Xd_X + \gamma a_x[-V_X + (V_X - V_Y - V_{XY})d_Y + p_xv_X]$$
$$\frac{\partial V^b}{\partial b_y} = v_Y - v_Yd_Y + \gamma a_y[-V_Y + (V_X - V_Y - V_{XY})d_X + p_yv_Y]$$

Our purpose with this more complicated model is to provide some analytical support for our contention that focusing and pinning will appear in a wide range of decision circumstances. We therefore focus on examples which illustrate such equilibria in the more complex model rather than developing a general characterization for such equilibria. Before moving to these examples, however, we show that endogenous delay is necessary to obtain focusing and pinning.

6.1 Exogenous Delay Benchmark

This benchmark setting corresponds to the situation in which resource decisions in the first period have no effect on delay. When $\gamma = 0$, delay, defined in the model as $d_i = z_D - \gamma a_i b_i$ becomes exogenously dependent on z_D alone.

Because the first period resource choices have no effect on whether an issue is delayed, the players maximize an objective function that is the same as that faced in the second period (static) setting where both issues are still on the agenda except for a scaling determined by the level of exogenous delay. Hence we have

Lemma 3 *Consider the symmetric model. If delay is exogenous, i.e., $\gamma = 0$, then the optimal first-period actions a_X, a_Y, b_X, and b_Y are the same as the corresponding optimal actions in the static equilibrium when issues X and Y are both on the agenda. (Proof in appendix)*

This result means that effects of exogenous delay on optimal actions are isolated in the model from the effects of strategic delay. Hence, in what follows we can attribute changes in first-period actions relative to the optimal static equilibrium actions as resulting from strategic choices. Exogenous delay does, of course, affect overall outcomes by creating an "agenda" for decision making in the second period. Without delay all issues would be resolved in the first period.

With this preliminary in place, we now begin our analysis of some examples of strategic delay using our symmetric model.

6.2 Example of Strategic Delay in a Symmetric Model with Partial Conflict

We again focus our analysis on the most interesting cases from the base model: examples involving partial conflict with preferences that might induce focusing or pinning. Without loss of generality, one can normalize $u_X = -1$, $v_Y = 1$ and then choose v_X and u_Y to generate differences in the intensity and direction of preferences. Consider a partial conflict setting in which players A and B both oppose issue X, while and player A opposes Y and player B supports Y.

The second period optimal strategies for this setting are easy to analyze. With issue X only, both players oppose and we have $U_X = u_X(z - 2\bar{p})$ and $V_X = v_X(z - 2\bar{p})$. With issue Y only both players have opposite preferences and $U_Y = u_Y z$ and $V_Y = v_Y z$. With both issues active, we have the unique optimal static choices given by $u_X = g'(-a_X^*)$ and $a_Y^* = -g(a_X^*)$ and

$-1 = g'(-b_X^*)$ and $b_Y^* = -b_X^*$. Thus, when both issues are active, the players divide their influence allocations.

We explore a particular numerical example of partial conflict in which A and B strongly care about issues X and Y, respectively, but care weakly about the outcomes of the other issue. To analyze this example we make a number of specific assumptions. Suppose the preferences are as below and we make a number of other assumptions regarding the parameters of the decision environment and the effectiveness of influence (g) function.[25] Then the following set of actions constitute an equilibrium in which both pinning and focusing are present.

Example 5 *Symmetric model example with focusing and pinning*

Preference Structure	*Player A*	*Player B*
Issue X	$u_X = -1$	$v_X = -0.01$
Issue Y	$u_Y = -0.01$	$v_Y = 1$

Equilibrium Actions	*first period {XY}*	*second{XY}*	*second {X}*	*second {Y}*
Issue X	$a_x = -0.228$ $b_x = 0.022$	$a_X = -0.2399$ $b_X = -0.024$	$a_X = -0.24$ $b_X = -0.24$	*NA* *NA*
Issue Y	$a_y = 0.0749$ $b_y = 0.239$	$a_Y = -0.024$ $b_Y = 0.2399$	*NA* *NA*	$a_Y = 0.24$ $b_Y = -0.24$

Focusing: In this example is that player A's gain from focusing is large enough that A takes actions on issue Y that are against interest. That is, in a static equilibrium A would allocate a small amount against issue Y. Here, however, A allocates a larger amount in favor of issue Y. By so doing the probability that issue Y is resolved decreases from 0.35 to 0.17. Here A's actions against (short-run) interest replaces conflict with agreement in the first period. As in the asymmetric model, the focusing incentive is strongest when there are strong asymmetries in the degree to which they care about each decision. That is, the issue that player A cares most about is the one that player B cares least about and vice versa. Furthermore, the player that adopts a focusing strategy is the one which cares the most about the decision over which there is agreement. Focusing will not occur through

[25] Each player has resources sufficient (if unchallenged) to increase the probability of acceptance or rejection of a single issue by nearly one quarter ($\overline{p} = 0.24$) with issues that have a base one-period probability of acceptance of 0.5 ($z = 0.5$). Resources between issues can be traded off according to $g(a, \overline{p}) = \sqrt{\overline{p}^2 - a^2}$. Finally, delay is very likely should both players use all of their resources in opposition to each other ($\gamma = 10$ and $z_D = 0.35$).

actions on a decision that increase the level of conflict between the two players. Increased opposition reduces the probability that the decision will be resolved. Hence, if conflict exists, focusing requires that it be decreased.

Pinning The great asymmetry in preferences and partial conflict also create significant incentives for player B to pin player A to proposal X. Player A's concern with issue X–the reason for A to engage in some focusing activity– means that A will load its attention on issue X rather than issue Y if both issues are still on the agenda. In the second period A will oppose decision Y while B will support the decision. Hence, B would prefer that A is pinned to issue X. Player B can do this by increasing the probability that issue X is delayed in the first period. In this example, B also goes against her short-run interest by spending against a proposal she weakly favors thereby increasing delay from 0.35 to 0.40.

It is straightforward to find examples in which both players pin each other and in which both players focus each other. Finally, there are also examples involving focusing where the players appear to coordinate to attack one issue at a time.[26]

7 Conclusion

When an important current decision is made that does not involve real commitment, the decision remains either explicitly on the agenda because the decision was deferred or implicitly on the agenda because the decision is reversible (e.g. the Obama health care plan). These previous decisions affect the outcomes of future decisions because resources used to influence outcomes are allocated differently. Anticipating such future potential effects, in turn, may change the allocation of current resources. These decision dynamics lead to two closely related strategies: taking actions against interest to pin a rival to that proposal in the subsequent decision making round or taking actions against interest to resolve the proposal now, so as to focus a rival on fewer issues in the subsequent round. These strategic actions require decision participants to have strong preferences for one issue over another. When preferences are balanced across issues, there is no net incentive to take actions

[26] Our base model forces a resolution at the end of the second period and, hence, effectively does not allow the second proposal to be delayed. There are, of course, some settings in which delay is not an option. The symmetric model, however, does allow delay to occur with both options and allows the likelihood of delay to increase with the extent of disagreement. Because the symmetric model produces analogous results to those in the base model, we do not think that asymmetric delay in the base model is responsible for our basic results.

against interest. Strategies of pinning and focusing also alter the value of having one issue precede another issue. The analysis, threfore, has implications for medium-term agenda setting which can be thought of as agenda setting across meetings rather than the more commonly analyzed problem of agenda setting within a meeting.

Our approach was to explore a simple setting to illustrate various ways in which deferring decisions matter. Our decision setting involved just two participants who influence decision outcomes. These participants could be viewed as the decision makers themselves, for example, as part of a committee or they could be viewed as subordinates who attempt to influence the decision of superior. In either case, there is much room to extend the theoretical analysis to multiple participants with varying resources as well as to consider additional issues. In addition to exploring the effect of deferring decisions empirically, other arguably interesting avenues would be to consider the effect of related decisions in this strategic context and to explore how cross-meeting strategic effects create incentives for introducing particular types of proposals which are selected or designed in part to take advantage of the preferences of the decision participants.

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Appendix

Proof. of Lemma 1: This is straightforward. We prove the results for Agent A; the proof for B is a simple change of labels. Property (iii), $sgn(a_i) = sgn(u_i)$, is trivial. If $u_i > 0$ but $a_i < 0$, then $u_i a_i < 0 < -u_i a_i$ and $-a_i > 0$ is a better choice for A. Similarly, if $u_i < 0$ but $a_i > 0$, then $-a_i > 0$ is again a better choice. For (ii), $g(|a_X| = |a_Y|$, suppose not. By feasibility, we have $g(|a_X|) > |a_Y|$. If $u_Y > 0$, then a choice of a_X and $\hat{a}_Y = g(|a_X|)$ yields a higher payoff. Similarly, if $u_Y < 0$, then using the slack in resources to set $\hat{a}_Y = -g(|a_X|)$ increases the payoff. Because the objective, $u_X a_X + u_Y a_Y$, is linear and the constraint set, $g(|a_X| \leq |a_Y|$ for $0 \leq |a_X| \leq \bar{p}$, is symmetric, Properties (ii) and (iii) of Lemma 1 imply that we can solve Agent A's choice problem for any (u_X, u_Y) by first solving the problem for the case of $u_X > 0$ and $u_Y > 0$ and then making a simple adjustment of sign on the optimal influence choices.

Thus, for $u_X > 0$ and $u_Y > 0$ the choice problem of Agent A reduces to

$$\max\left[u_X a_X + u_Y g(a_X)\right] \qquad s.t. \qquad 0 \leq a_X \leq \bar{p}$$

This is a continuous objective on a compact set and therefore has a solution. Since g is strictly concave, the solution is uniquely determined by the first-order condition $u_X + u_Y g'(a_X) = 0$. By part (v) of Condition 1 for g, the solution is interior. For reference, we use $a_X(u)$ and $a_Y(u)$ to denote the solution for any ratio $u \equiv |u_X/u_Y| > 0$. Comparative statics are straightforward. Defining $G(u) \equiv [g']^{-1}(-u)$, these are given by and given by $a'_X(u) = -1/g''(G(u)) > 0$ and $a'_Y(u) = u/g''(G(u)) < 0$. Finally, note that $ua'_X(u) + a'_Y(u) = 0$ (Envelope Theorem). ■

Proof. of Lemma 2: By Case 1, we have $v_X > 0 > u_X$, $u_Y > 0$ and $v_Y > 0$. Then, $U_X = zu_X$, and $V_X = zv_X$, since $a_X = -\bar{p}$ and $b_X = \bar{p}$. Similarly, $U_Y = (z + 2\bar{p})u_Y$, and $V_Y = (z + 2\bar{p})v_Y$, since $a_Y = b_Y = \bar{p}$. Finally, $U_{XY} = u_X\left(z_X + a_X^* + b_X^*\right) + u_Y\left(z_Y + a_Y^* + b_Y^*\right)$ and $V_{XY} = v_X\left(z_X + a_X^* + b_X^*\right) + v_Y\left(z_Y + a_Y^* + b_Y^*\right)$, by the optimal static choices from Lemma 1 when X and Y are both on the agenda. Player B chooses b_x to maximize $(z_X + a_x + b_x)(v_X + V_Y) + [1 - (z_X + a_x + b_x)]V_{XY}$. Clearly, since the objective is linear, $b_X = \bar{p}$ iff $v_X + V_Y > V_{XY}$. Simplifying, this inequality reduces to

$$v_X + (z + 2\bar{p})v_Y > \left(z_X + a_X^* + b_X^*\right)v_X + \left(z_Y + a_Y^* + b_Y^*\right)v_Y$$

This is valid because (1) $1 > z_X + a_X^* + b_X^*$, by condition 2; (2) $z + 2\bar{p} > z + a_Y^* + b_Y^*$ by $\bar{p} \geq a_Y$ and $\bar{p} \geq b_Y$, and (3) each of $v_X > 0$ and $v_Y > 0$ holds by the case assumption.

■

Proof. of Proposition 1: Player A chooses a_x to maximize $\{(z_X + a_x + b_x)(u_X + U_Y) + [1-(z_X+a_x+b_x)]U_{XY}\}$. The solution is $a_x = \overline{p}$ iff $u_X+U_Y > U_{XY}$ (it is $a_x = -\overline{p}$ when $u_X+U_Y < U_{XY}$). Substituting for U_Y and U_{XY} (see Proof of Lemma 2), rearranging terms, and dividing by $u_Y > 0$, we have

$$u_X + U_Y > U_{XY} \Leftrightarrow (2\overline{p} - a_Y^* - b_Y^*) - \frac{u_X}{u_Y}(1 - z_X - a_X^* - b_X^*) > 0.$$

Now, define $u \equiv -\frac{u_X}{u_Y} > 0$ and $v \equiv \frac{v_X}{v_Y} > 0$, and write the the optimal choices in the $\{XY\}$ state in terms of the solutions to the first-order conditions, that is $(a_X^*, a_Y^*) = (-a_X(u), a_Y(u))$ and $(b_X^*, b_Y^*) = (b_X(v), b_Y(v))$. Then our condition for $a_x = \overline{p}$ becomes

$$h(u, v) \equiv \left[2\overline{p} - a_Y(u) - b_Y(v)\right] - u[1 - z_X + a_X(u) - b_X(v)] > 0$$

We claim that, for any $v > 0$, the function $h(u, v)$ is (1) decreasing in u, (2) positive at $u = 0$, (3) negative as $u \to \infty$, and, hence, (4) there $\exists!\ u \ni h$ crosses 0. To show (1), differentiate h w.r.t. u and apply the envelope theorem, $a_Y'(u) + ua_X'(u) = 0$, to find $h_u = -[1 - z_X + a_X(u) - b_X(v)] < 0$, as follows from Condition 2 for interior probabilities. For (2), let $u \to 0$ and note that $a_X(u) \to 0$ and $a_Y(u) \to \overline{p}$, so that $h(0, v) = \left[\overline{p} - b_Y(v)\right] > 0$. For (3), letting $u \to \infty$ in $h(u, v)$ and noting $a_X(u) \to \overline{p}$ and $a_Y(u) \to 0$, we see $h(u, v) \to -\infty$. Then, (4) follows by continuity and $h(u, v)$ crosses zero one time at a unique $u = \bar{u}_F(v) \in (0, \infty)$. Thus, $h(u, v) > 0$ holds for $0 < u < \bar{u}_F(v)$ and then $a_x = \overline{p}$, while $h(u, v) < 0$ holds for $u > \bar{u}_F(v)$ and then $a_x = -\overline{p}$. Finally, for later reference, note that $h(0, 0) = 0$, so that we have $\bar{u}_F(0) = 0$. ■

Proof. of Proposition 2: To verify that $\bar{u}_F(0) = 0$, observe that $b_x(0) = 0$ and $b_y(0) = \overline{p}$ so that $h(u, 0) = \overline{p} - a_Y(u) - u[1 - z_X + a_X(u)]$. At $u = 0$, we have $a_X(0) = 0$ and $a_Y(0) = \overline{p}$. This implies $h(0, 0) = 0$ and, hence, $\bar{u}_F(0) = 0$. To show that $\bar{u}_F(v) < v$ for any $v > 0$, it is sufficient to show that $h(v, v) < 0$ since this implies h crosses zero to the left of v. Simplifying $h(u, v)$ at $u = v$, we have

$$h(v, v) = 2[\overline{p} - b_Y(v)] - v[1 - z_X].$$

This is decreasing in v since $-2b_Y'(v) - (1 - z_x) < 0$ and, since $h(0, 0) = 0$, we have shown $h(v, v) < 0$, as required. ■

Proof. of Proposition 3: In a focusing equilibrium, player A chooses $a_x = \overline{p}$ against own interest based on $u_X < 0$. The choice $a_x = \overline{p}$ is optimal iff $u_X + U_Y - U_{XY} > 0$. Substituting for U_Y and U_{XY}, noting that $\hat{a}_Y + \hat{b}_Y = 0$ [where $\hat{a}_Y$ and $\hat{b}_Y$ are the optimal actions where only issue Y is on the second-period agenda] as players A and B choose oppositely in Y, and rearranging terms yield

$u_X + U_Y - U_{XY} > 0 \Leftrightarrow$

$$u_X[1-(z_X + a^*_X + b^*_X)] - (a^*_Y + b^*_Y)u_Y > 0. \tag{12}$$

To show that alignment in Y is necessary, we show that the first order condition for focusing (12) cannot hold when players A and B conflict on issue Y. There are two cases for conflict (A) $u_Y > 0 > v_Y$ and (B) $u_Y < 0 < v_Y$.

Case A ($u_X < 0$ and $u_Y > 0 > v_Y$): Consider (12). Substitute with $u = -u_X/\ u_Y > 0$ and simplify with the solutions to the first-order conditions, $(a^*_X, a^*_Y) = (-a_X(u), a_Y(u))$ and $(b^*_X, b^*_Y) = (b_X(v), -b_Y(v))$, to see that (12) holds iff

$$[b_Y(v) - a_Y(u)] - u\,[1-(z_X - a_X(u) + b_X(v))] > 0$$

This expression is strictly decreasing in v, as the partial is $b'_Y(v) - ub'_X(v) < 0$. For any u, the value at $v = 0$ is $[\bar{p} - a_Y(u)] - u\,[1-(z_X - a_X(u))]$; in turn, this value is zero at $u = 0$ and it is strictly decreasing in u since the partial (applying the Envelope Theorem) is $-\,[1-(z_X - a_X(u))] < 0$. Hence, the expression is never positive, which is a contradiction.

Case B ($u_X < 0$ and $u_Y < 0 < v_Y$) : Consider (12). Substitute with $u = u_X/\ u_Y > 0$ and simplify with the solutions to the first-order conditions, $(a^*_X, a^*_Y) = (-a_X(u), -a_Y(u))$ and $(b^*_X, b^*_Y) = (b_X(v), b_Y(v))$, to see that (12) holds iff

$$[b_Y(v) - a_Y(u)] - u\,[1-(z_X - a_X(u) + b_X(v))] > 0.$$

Since this is the same expression as in Case A, we have a contradiction. ■

Proof. of Proposition 4: The partial conflict pinning assumptions are: $v_X > 0 > u_X$, $u_Y > 0$ and $v_Y > 0$. Player B chooses b_y to maximize $(z_Y + a_y + b_y)(v_Y + V_X) + [1-(z_Y + a_y + b_y)]V_{XY}$. Thus, $b_y = -\bar{p}$ iff $v_Y + V_X < V_{XY}$. Substituting for V_X and V_{XY} (see Proof of Lemma 2), rearranging terms and dividing through by $v_Y > 0$, we have

$$v_X + V_Y < V_{XY} \Leftrightarrow 1 - [z_Y + a^*_Y + b^*_Y] - \frac{v_X}{v_Y}(a^*_X + b^*_X) < 0.$$

As before, define $u \equiv -\frac{u_X}{u_Y} > 0$ and $v \equiv \frac{v_X}{v_Y} > 0$, and write the the optimal choices in the $\{XY\}$ state in terms of the solutions to the first-order conditions, that is $(a^*_X, a^*_Y) = (-a_X(u), a_Y(u))$ and $(b^*_X, b^*_Y) = (b_X(v), b_Y(v))$. Then our condition for $b_x = -\bar{p}$ becomes

$$k(v,u) = 1 - [z_Y + a_Y(u) + b_Y(v)] - v\,[b_X(v) - a_X(u)] < 0.$$

Next, we claim that, for any $u > 0$, the function $k(v, u)$ is (1) increasing in v for $v < u$ and decreasing in v for $v > u$, (2) positive at $v = 0$, (3) negative as $v \to \infty$, and, hence, (4) there $\exists!\ v \ni k$ crosses 0. To show (1), differentiate k w.r.t. v and apply the envelope theorem, $b'_Y(v) + vb'_X(v) = 0$, to find $k_v = a_X(u) - b_X(v)$. From the proof of Lemma 1, we know that $a_X(u) \gtrless b_X(v)$ as $u \gtrless v$ since both are increasing in the utility intensity. Then, (1) follows directly. For (2), let $v \to 0$ and note that $b_X(v) \to 0$ and $b_Y(v) \to \bar{p}$, so that $k(0, u) = 1 - [z_Y + a_Y(u) + \bar{p}] > 0$, by Condition 2. For (3), letting $v \to \infty$ in $k(v, u)$ and noting $b_X(v) \to \bar{p}$ and $b_Y(v) \to 0$, we see $k(v, u) \to -\infty$. Then, (4) follows by continuity and $k(v, u)$ crosses zero one time at a unique $v = \bar{v}_P(u) \in (0, \infty)$. Thus, $k(v, u) > 0$ holds for $0 < v < \bar{v}_P(u)$ and then $b_y = \bar{p}$, while $k(v, u) < 0$ holds for $v > \bar{v}_P(u)$ and then $b_y = -\bar{p}$.

Note that, by property (1), for a given u, the maximum of k over all $v \geq 0$ occurs at $v = u$. Since $k(u, u) > 0$, it follows that k crosses zero in v to the right of $v = u$ and we therefore have $\bar{v}_P(u) > u$. Finally, note that $k(0, 0) > 0$, so that we have $\bar{v}_P(0) > 0$.

A completely symmetric argument shows that Player A also has a cut-off value, denoted by $\bar{u}_P(v)$ and it is defined by the condition $k(\bar{u}_P, v) = 0$. The claim regarding a pinning equilibrium now follows directly. For $v > \bar{v}_P(u)$, we know Player B optimally chooses $b_y = -\bar{p}$. Because $\bar{v}_P(u) > u$, we see that $v > u$ holds. We then have $\bar{u}_P(v) > v > u$ and Player A optimally chooses $a_y = \bar{p}$. ■

Proof. of Proposition 5: Implicit differentiation of $k(\bar{v}_P, u) = 0$ yields $\bar{v}'_P(u) = -k_u/k_v$, the ratio of partials. We know $k_v < 0$ holds when $k(\bar{v}_P, u) = 0$. Also, we easily find that $k_u = -a'_Y(u) + va'_X(u) > 0$. Hence, $\bar{v}'_P(u) > 0$. Finally, $\bar{v}_P(u) > u$ was shown in the last proof. ■

Proof. of Proposition 6: In a pinning equilibrium player B chooses $b_y = -\bar{p}$ against own interest based on $v_Y > 0$. We know $b_y = -\bar{p}$ is optimal when the condition $v_Y + V_X - V_{XY} < 0$ holds. Substituting for V_X and V_{XY} and rearranging terms $v_Y + V_X - V_{XY} < 0 \Leftrightarrow$

$$v_Y[1 - (z_Y + a^*_Y + b^*_Y)] + (\hat{a}_x + \hat{b}_x)v_X - (a^*_X + b^*_X)v_X < 0 \tag{13}$$

where $\hat{a}_x$ and $\hat{b}_x$ are the optimal actions where only issue X is on the second-period agenda. Now suppose that A and B are aligned on X. There are two cases of alignment.

Case 1 ($u_X > 0, v_X > 0$): then $\hat{a}_x = \hat{b}_x = \bar{p}$. But then $v_Y[1 - (z_Y + a^*_Y + b^*_Y)] + (2\bar{p} - a^*_X - b^*_X)v_X > 0$ which contradicts (13)

Case 2 ($u_X < 0, v_X < 0$): then $\hat{a}_x = \hat{b}_x = -\bar{p}$. Then $v_Y[1 - (z_Y + a^*_Y + b^*_Y)] - (2\bar{p} + a^*_X + b^*_X)v_X > 0$ and contradicts (13)

Hence, pinning cannot occur with alignment over the second issue.

A completely symmetric argument applies if Player A is the pinning player. ■

Proof. of Proposition 7 ■

This proof is done assuming a common z on issues X and Y. The payoff comparison for B across the two agendas, $X \to Y$ and $Y \to X$, is given by

$$\begin{aligned} V_F^b &\equiv (z_X + 2\bar{p})(v_X + V_Y) + [1 - (z_X + 2\bar{p})]V_{XY} > z_X(v_Y + V_X) + (1 - z_X)V_{XY} \equiv V_P^b \\ \Leftrightarrow &\quad (z_X + 2\bar{p})(v_X + V_Y - V_{XY}) > z_X(v_Y + V_X - V_{XY}). \end{aligned}$$

By Lemma 2, we have $v_X + V_Y - V_{XY} > 0$. By existence of the pinning equilibrium, we have $v_Y + V_X - V_{XY} < 0$. Thus, the inequality holds.

The payoff comparison for A across the two agendas is more subtle. To begin, we have

$$\begin{aligned} U_F^a &\equiv (z_X + 2\bar{p})(u_X + U_Y) + [1 - (z_X + 2\bar{p})]U_{XY} < z_X(u_Y + U_X) + (1 - z_X)U_{XY} \equiv U_P^a \\ \Leftrightarrow &\quad (z_X + 2\bar{p})(u_X + U_Y - U_{XY}) < z_X(u_Y + U_X - U_{XY}). \end{aligned}$$

Note that this inequality always holds at $u = \bar{u}_F(v)$ since this implies $u_X + U_Y - U_{XY} = 0$ while the right-hand side is positive since

$$u_Y + U_X - U_{XY} > 0 \Leftrightarrow u_Y[1 - (z_Y + a_Y(u) + b_Y(v))] - u_X(b_X(v) - a_X(u)) > 0,$$

as follows from $u_Y > 0 > u_X$, $1 > z_Y + a_Y(u) + b_Y(v)$ by feasible probabilities, and $b_X(v) > a_X(u)$ by $v > u$. To extend this to all (u, v) for which focusing and pinning equilibria exist, first simplify the inequality for $U_F^a < U_P^a$ by substituting for the U_X, U_Y and U_{XY} terms and note that $U_F^a < U_P^a$ iff

$$D(u, v) \equiv (z + 2\bar{p})^2 - z - 2\bar{p}(z_Y + a_Y(u) + b_Y(v)) - u[z + 2\bar{p} - z - 2\bar{p}(z - a_X(u) + b_X(v))] < 0.$$

Note that $D(u, v)$ is strictly decreasing in u and strictly increasing in v:

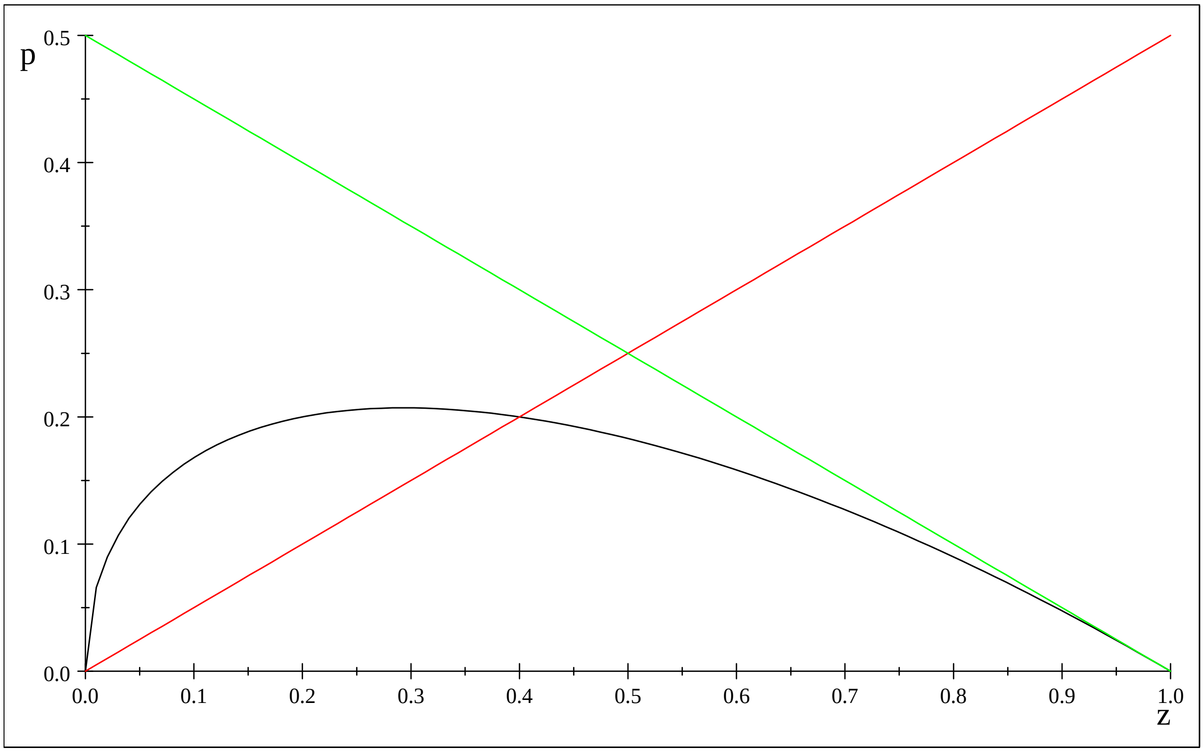
$$\begin{aligned} \frac{\partial D(u, v)}{\partial u} &= -z(1 - z) - 2\bar{p}[1 - (z - a_X(u) + b_X(v))] < 0 \\ \frac{\partial D(u, v)}{\partial v} &= 2\bar{p}[ub_X'(v) - b_Y'(v)] < 0, \end{aligned}$$

as follows from feasible probabilities and $b_X'(v) < 0 > b_Y'(v)$. If we can show $\lim_{v \to \infty} D(0, v) < 0$, then we will have $D(u, v) < 0$ for any $u \leq \bar{u}_F(v)$ since montonicity in u and v implies $\lim_{v \to \infty} D(0, v) > D(0, v) > D(u, v)$. From the definition, we find

$$\lim_{v \to \infty} D(0, v) = 2\bar{p}(z + \bar{p}) - z(1 - z)$$

since $a_X(u) \to 0$ and $a_Y(u) \to \bar{p}$ as $u \to 0$, and $b_X(v) \to \bar{p}$ and $b_Y(v) \to 0$ as $v \to \infty$.

To characterize the limitng value of D in terms of the z and $\bar{p}$ parameters, recall that our feasible set is given by z and $\bar{p}$ in $(0,1)$ for which $2\bar{p} < z < 1 - 2\bar{p}$ or, equivalently, $0 < \bar{p} < z/2$ for $z \leq 1/2$ and $0 < \bar{p} < (1-z)/2$ for $z \leq 1/2$. Solving for $\bar{p}$ in the implied quadratic $2\bar{p}(z + \bar{p}) - z(1-z) = 0$ from the $\lim_{v\to\infty} D(0,v)$ expression, we see that $\lim_{v\to\infty} D(0,v)$ holds when $\bar{p} \leq [\sqrt{2z - z^2} - z]/2$. As is easily verified, this necessarily holds when $z < 2/5$. Over full feasible parameter set for z and $\bar{p}$, we calculate that $\lim_{v\to\infty} D(0,v) < 0$ holds for approximately 89% of th ergion. Refer to the figure below.



Proof. of Lemma 3 $\gamma = 0$ implies that $d_X = d_Y = z_D$. $U^a = z_D^2 U_{XY} + z_D(1-z_D)[U_X + p_Y u_Y] + (1-z_D)z_D[p_X u_X + U_Y] + (1-z_D)^2[p_X u_X + p_Y u_Y]$ which, after rearranging terms and simplifying gives $U^a = z_D[U_X + U_Y] - z_D^2[U_X + U_Y - U_{XY}] + (1-z_D)[p_X u_X + p_Y u_Y]$. Similarly, $V^b = z_D[V_X + V_Y] - z_D^2[V_X + V_Y - V_{XY}] + (1-z_D)[p_X v_X + p_Y v_Y]$. Maximizing U^a and V^b involves solving $\max\limits_{a_X,a_Y}\{p_X u_X + p_Y u_Y\}$ and $\max\limits_{b_X,b_Y}\{p_X v_X + p_Y v_Y$ with solutions that are the same as those for the static actions when both issues X and Y are on the agenda. ■