How the Senate and the President Affect the Balance of Power in the House: A Constitutional Theory of Intra-Chamber Bargaining

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11/17/08 edit notes: Change sq to q in all figures. Check to make sure that references in the "reference" section match those in the text.

Abstract

Can a change in the identity of the President, or a shift in the Senate's partisan dynamics, affect the balance of power in the House of Representatives? We argue that they can. The intuition is that a change in the Senate or President can alter the set of legislative outcomes that House members regard as feasible. Such alterations can change members' expectations about the policy consequences of various intra-House power allocations. These changing expectations can lead to a redistribution of bargaining power that, in turn, can cause new power-sharing arrangements to emerge. This perspective clarifies how the U.S. Constitution's inter-chamber and inter-branch dynamics affect House power-sharing arrangements. As a result, it yields new, and empirically effective, predictions about the timing of important procedural changes in the House.

Amongst the most important decisions made by the US House of Representatives are those that affect the chamber's power relations. These decisions include appointing powerful committee and floor leaders and allocating authority amongst these positions. Collectively, these decisions affect the extent to which various House members influence law and policy.

These decisions are also of great interest to scholars. One reason for this interest is that the decisions are largely unconstrained. The US Constitution (Article I, Section 5) places few limitations on how the House allocates power amongst its members. In particular, legislators can change these allocations of power at any time. This broad latitude prompts many questions about how House members allocate power amongst themselves and about the moments at which they choose to change prior allocations.

Many scholars have attempted to explain how the House makes these decisions by examining the chamber's organizational logic. In recent scholarship on this topic, three theories are focal. One theory, for which the work of Shepsle and Weingast (1987) is iconic, contends that distributional concerns drive allocations. Here, House power relations are managed through a committee system, which uses jurisdiction-bound agenda controls and the threat of *ex post* vetoes in conference committees to enforce legislative bargains among House members. A second theory (Krehbiel 1991) focuses on the preferences of the floor's median voter and posits efficient information distribution as a key goal of power allocation. Schickler (2000) builds on this idea by arguing that when the floor median moves closer to (away from) the median member of the majority party, she will favor rule changes that enhance (limit) the majority party's agenda powers. A third theory focuses on parties as organizational cartels. Cox and McCubbins (1993, 2005) argue that redistributions of power come from changes inside the majority party itself.

Rohde (1991), Aldrich (1994) and Aldrich and Rohde (2000) further argue that changes in the inter-party heterogeneity and/or intra-party homogeneity will affect House power allocations.

These theories, and others like them, have transformed our understanding of Congress. They also set an agenda for subsequent work. We seek to build on these accomplishments, while clarifying logical implications of an understudied attribute of congressional bargaining.

We follow previous theories by portraying House members as rational, strategic, and acting with policy-related goals in mind. Our new direction concerns the treatment of the Senate and the President. Unlike previous theories, we argue that the Senate and the President affect decisions regarding the House's balance of power.

We begin by recognizing that House members achieve policy-related goals by passing legislation. Article I, Section 7 of the Constitution allows the House to make laws only if the Senate and President act in particular ways (e.g., the House and Senate must agree on all wording matters before seeking Presidential approval). So regardless of whether partisan, informational, or distributional concerns influence the House, members know that the legislative consequences of their endeavors depend on subsequent actions of the Senate and President. This fact motivates a *constitutional theory of House bargaining*.

We use a formal model to illuminate substantive and empirical implications of the theory. The model has three stages, where each stage reflects constitutional requirements of legislative processes that can affect the expectations that House members have when they negotiate with one another. First is a *power-sharing stage* where House members bargain over how to allocate power amongst themselves. This stage represents the bargaining process that occurs at the beginning of each new session of the US House of Representatives though it can reflect other moments at which House members devote effort to internal reallocations of power. Second is a *reconciliation stage* where representatives of the House (determined by the power allocation agreement) and Senate (modeled as an exogenous unitary actor with possibly distinct preferences) can settle their differences. Third is a *constitutional stage* where the President (another unitary actor with possibly distinct preferences) can approve or reject legislative proposals made in the reconciliation stage. Unlike many models of bargaining amongst House members, our model includes a role for the Senate and the President. We include these actors not because we believe that the Senate and President are directly involved in House power negotiations, we include them because we believe that the Constitution gives House members incentives to consider reconciliation and constitutional stage dynamics when allocating power. In sum, we seek to clarify how reconciliation and constitutional stage dynamics suggested by Article I, Section 7 affect power allocation decisions made under Article I, Section 5.

Using this approach, we identify conditions in which changing the preferences of the Senate or President, while holding constant the preferences of all House members, is sufficient to alter the House's balance of power. The intuition we uncover is that when changes in the preferences of the Senate or President reshape the set of achievable legislative outcomes, they can change House members' expectations about the policy consequences of various power allocations. Such expectation changes, in turn, can cause members to seek different power allocations.

Our results have several substantive implications. One concerns the relationship between centrist members of the House floor, whom Krehbiel (1991) and Schickler (2000) posit as pivotal, and the majority party's leadership, which is focal in the theories of Cox, McCubbins, Aldrich, and Rohde. We identify cases in which *moving the ideal point of the Senate or President is sufficient to shift* not only the balance of power between House's majority and minority parties, but also amongst factions of *the House's majority party*. In other words, we find that the balance of power between parties in the House, and also between intra-party factions, flows not just from the preferences of House or party members but also from the preferences of the Senate and the President. Our findings imply that if attempts to explain the timing of House power reallocations ignore changes in the Senate and President, then they will be subject to knowable inferential errors that follow from omitted variable bias. To make this point concretely, we draw from related empirical work (Sin 2008a) to show how our constitutional theory better predicts the timing of important changes in House procedures than do other focal theories.

The paper continues as follows: we introduce the model, we define the equilibrium, and we present our result. Then, we use examples to explain key substantive implications. A technical appendix follows the text.

The Model

The purpose of this model is to examine, in the simplest way possible, how constitutionally mandated activities that occur in the Senate and at the White House affect decisions within the House. It integrates important aspects of the US lawmaking process as a game of complete information. To facilitate the model's description, Table 1 lists the meaning of key pieces of notation.

Our primary use of the model will be to evaluate the truth value of the proposition that that House bargaining dynamics are always independent of changes in the Senate and President. To do this in a simple way, we include the Senate and President in the model in a straightforward manner. Specifically, we model the Senate and President as unitary actors.[1] We then examine how shifts in their respective preferences affect bargaining in the House.

[1] While modeling the Senate as a unitary actor simplifies reality, it offers a basis for theoretical progress vis-à-vis models that do not include the Senate. Our attempt to incorporate the Senate

[Table 1 about here]

Preferences

The game features a legislature with three representative House members, a Senate, and a President. We think of the House members as representing up to three ideological factions in the House and label them *F1*, *F2* and *F3*. We focus on the case where no faction constitutes a majority of the House -- $max(\%F1, \%F2, \%F3) < .5$ and $\%F1 + \%F2 + \%F3 = 1$. Since multiple factions can have identical policy preferences, this focus is without a loss of generality. In examples, we will refer to F1 and F2 as factions of the majority party and to F3 as the minority party. Nothing in the model depends on this particular majority/minority description of the factions – we offer them only as a simple means for interpreting the model's substantive implications.

Policy preferences motivate player actions. We assume that each player, including the Senate and President, comes from one of the three factions and that all players from a given faction have identical policy preferences. We define these preferences using ideal points ($F1 \in \Re^2$, $F2 \in \Re^2$, $F3 \in \Re^2$, $s \in \{F1, F2, F3\}$, $p \in \{F1, F2, F3\}$), and a policy space (the Euclidean plane $\Re^2$). So, for

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follows other recent inquiries. The closest to ours substantively is Bovitz and Hammond's (2001) divide the dollar examples that "illustrate general points about the great importance of inter-institutional context for theories of how distributive politics is institutionally organized" (2001:30). Tsebelis (2002) and Tsebelis and Money (1997), by contrast, use cooperative game theory to show how a second chamber limits the House's ability to achieve policy goals.

any player in faction $i \in \{1, 2, 3\}$ and legislative outcome $L \in \Re^2$, we denote player i's policy utility as $U_i(F_i, L) = -|F_i - L|$.[2]

Of course, only two parties are usually represented in the House. Why have three factions? Three factions is the simplest way to allow preference diversity within the majority party to affect inter-party and intra-party bargaining in our model. So if *F1* and *F2* collectively constitute the majority party, our assumption allows members of the majority party to threaten to withhold support from proposals by other members of their party when such proposals make them sufficiently unhappy.[3]

Sequence of Events

The game has three stages: a power-sharing stage, a reconciliation stage, and a constitutional stage.

[2] Note that this assumption allows many different configurations of House, Senate, and Presidential preferences. It allows for each of the three points to be located anywhere in the plane.

[3] The importance of intra-party factions in US politics has been emphasized by many scholars (Aldrich 1995, Brady and Bullock 1980, Burns 1963, Galloway 1976, Hasbrouck 1927, Nye 1951, Reiter 2001 and 2004, Rohde 1991, Schousen 1994, Smith and Deering 1984, Sinclair 1982), with prominent twentieth century examples featuring the Progressive and Conservative Republican factions during the first few decades of the century and the Southern and Northern Democratic factions of mid-century.

The Power-sharing Stage

Article I, Section V empowers the House to design its own power-sharing arrangement but provides only minimal instructions on how to do so. Its complete instruction is "Each House may determine the rules of its proceedings, punish its members for disorderly behavior, and, with the concurrence of two thirds, expel a member." While the Constitution does not mandate majority approval for such decisions, the House has traditionally adopted this convention. We will do the same.

[Figure 1 about here.]

Figure 1 depicts our model of the power-sharing stage. In it, *F1* goes first and has an opportunity to offer a power-sharing arrangement to *F2* or *F3*. If *F1* fails to make an acceptable offer, then *F2* can make an offer to *F3*. Successful arrangements require the support of two factions. If no faction makes an acceptable offer, the game ends with legislative outcome $L=q$, where $q \in \Re^2$ represents a pre-existing aggregate policy status quo.[4]

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[4] *F3* does not make an offer. This simplification has a substantive consequence, but does not affect our claims about the timing of House power allocations. To see why, note that the simplification does not prevent F3 from participating in a power-sharing arrangement. Since the game is one of complete information, if there exists an agreement that *F3* and either *F1* or *F2* would find beneficial, then *F1* or *F2* can make it. Therefore, with respect to the question on which we focus, "Under what conditions does a change in the preferences of the Senate or President produce a change in the balance of power in the House?" the simplification has no effect. The simplification would be consequential for the question "Who gets what?" because *F3*'s inability to make an offer means that it sometimes derives a smaller share of power than it otherwise would.

Offers are of the following form: "If you, faction *F2*, join with us, faction *F1*, then together, we shall commit to a power allocation that is weighted in the following manner: with probability $c_1^2 \in [0, 1]$ the House shall act as if my faction's ideal point is its own and with probability $1 - c_1^2$ it shall act as if your faction's ideal point is its own." Here, subscripts denote the faction making the offer and superscripts denote the faction to whom the offer is made.

We represent the agreement as probabilistic for two reasons. First, we want to adopt the perspective of House members at moments where they make decisions about whether to propose a new allocation of power in the House. At these moments, they are uncertain about which issues will arise in future sessions and hence, must rely on probabilistic beliefs about how today's power allocations will translate into tomorrow's policy outcomes. Second, we seek to reflect the fact that many House power-sharing agreements are intended to persist for some period of time -- often the duration of the coming legislative term. Therefore, for our purpose of attempting to clarify the relationship between shifts in the Senate and President and shifts in power-sharing in the House, it is sufficient to represent agreements to give one faction the speakership, another faction the chair of a prestigious committee, and altering House rules to reallocate the procedural and agenda setting rights of such positions as analogous to agreeing that "your faction controls the legislative process (from the drafting and processing of bills to *ex post* controls on conference committees) X% of the time, while my faction controls it in 100-X% of circumstances."

To complete the description of the power-sharing stage, we define its tie-breaking rules. For reactions to an offer: if an offer yields the same utility as the status quo, it is accepted. If an offer from *F1* yields the same utility as an offer from another faction, it is accepted (i.e., if *F2* is indifferent between coalitions with *F1* and *F3*, it chooses *F1* to keep all power within the majority party). For making an offer: if no offer provides the offering faction with greater utility than the consequence of making no offer, then no offer is made.

The Reconciliation Stage

During a congressional session, the House and Senate produce bills. If the Senate's offerings are not identical to those of the House, a need for reconciliation arises. Article 1, Section 7 requires that the chambers reconcile their differences before seeking presidential approval – but it provides no instructions on how to reconcile. Various reconciliation methods have been used over the years. They range from informal consultations to assembling a formal conference committee in which House and Senate delegates engage in sustained negotiations. All reconciliation procedures share a common characteristic: they require approval by both the House's *and* Senate's representatives to the reconciliation effort. For example, when the House and Senate attempt to reconcile their differences in a conference committee, the voting rule is that each chamber gets one vote and a proposal needs two votes to pass. As Bach (2001, CRS-22) points out, "A majority of the House managers and a majority of the Senate managers must approve and sign the conference report."

Following this pattern of behavior, we represent inter-chamber reconciliation efforts as a game between the Senate (here, a unitary actor) and the House's chosen representatives. We assume that the Senate seeks a reconciliation that is as close as possible to its ideal point, $s \in \{F1, F2, F3\}$. We assume that the House power-sharing arrangement determines its preferences in reconciliation attempts (i.e., we assume that when power-sharing arrangements allocate resources and agenda power, they affect the likelihood that particular interests will be represented in reconciliation attempts).[5] So, with probability $c_i^k \in [0, 1]$ the House's ideal point when negotiating with the Senate is that of faction i's ideal point and with probability 1- c_i^k it is faction k's ideal point.

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[5] Shepsle and Weingast (1987) portray House-Senate negotiations as providing *ex post* vetoes on House decisions. We extend their treatment by modeling House-Senate bargaining outcomes themselves as a function of the House's power-sharing arrangement. To see how a power arrangement can change the reconciliation outcome, consider how Speaker selection affects reconciliation. When inter-chamber negotiations are conducted through conference committees, House Rule 1, Clause 11 gives the Speaker complete discretion over conferee selection. Even after naming an initial set of conferees, the Speaker retains the right to subtract or add as s/he wishes. Moreover, the House cannot challenge the Speaker's choice of conferees through a point of order (Bach 2001, CRS-15). As Longley & Oleszek (1989: 38) argue, "[t]here is no effective way to challenge the Speaker's choice of conferees in the House." While we do not believe that the Speaker is entirely unconstrained – if enough members are sufficiently displeased they can replace the Speaker or reduce her powers -- the House rules give the Speaker considerable latitude to select conferees. A concrete example of this effect involved House Speaker Dennis Hastert. In October 1999, the House rejected a managed-care package that the Speaker supported. A bipartisan coalition then passed (by a vote of 275-151) an alternate plan that Hastert had worked hard to defeat. A non-identical companion bill was passed in the Senate. Reconciliation became necessary. A conference committee was formed. Hastert chose 13 Republican conferees to represent the House. All of his selections sided with the majority party leadership on this issue. Only *one of the 13 voted* for the bipartisan House bill. Excluded were many Republicans who supported the bipartisan bill including Greg Ganske of Iowa, who was

We now characterize the content of a reconciliation agreement. Many studies of this topic focus on 'who wins.' Considered as a whole, the literature on this subject has achieved no consensus. Some scholars find that the House is advantaged in negotiations, due to the chamber's superior ability to develop policy-specific expertise (Steiner 1951). Others disagree. They contend that: (1) the Senate Committees and conferees draw more directly and more completely upon the support of their parent chamber than do House Committees and their conferees (Fenno 1966, Vogler 1971), (2) the Senate's political decisions are more in line with the demands of interest groups and constituents (Manley 1973), (3) the Senate usually acts on legislation after it has been already passed by the House so it makes only marginal adjustments which are mostly accepted by the House (Strom and Rundquist 1977). Altogether, there is no consensus on whether one chamber gets way more often than the other.

Following this lack of consensus, and the lack of procedural instructions in Article 1 Section 7, we represent attempts to reconcile differences between the House and Senate by a simple algorithm – "split the difference if possible, otherwise recognize bargaining power." This algorithm first draws a straight line between the ideal point of the House's representative and the Senate. If the midpoint of this line can prevail as the game's legislative outcome, then it is the *reconciliation*, $r \in \Re^2$. Otherwise, the algorithm searches the entire space for the point closest to

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furious as he looked at the list of conferees, "Is that stacking the deck, is that trying to subvert the will of the House, or what?" (Carey 1999). In sum, Hastert used his ability to select conferees to kill a bill that passed the House by a very wide margin, even though he and other leaders of his party opposed it. This example shows the effect that selection of Speakers can have on the House preferences represented on reconciliation efforts. Lazarus and Monroe (2003) and Carson and Vander Wielen (2002) offer more general studies of this phenomenon.

the original midpoint that is a feasible legislative outcome (i.e., it can prevail in the game's constitutional stage, described below). This point then becomes the reconciliation. If no such point exists, then there is no reconciliation and the game ends with $L=q$ as the legislative outcome.

In our model, a reconciliation is the representation of a set of bills that House members foresee when they allocate power. We do not intend for it to represent a single bill. To motivate this assumption, recall that our goal is to use the game's second and third stage dynamics to explain decisions made in the first stage. So, when modeling the reconciliation stage, we work *from the perspective that House members have when they make such power-sharing decisions*. Hence, we assume that House members use common knowledge about the game's complete extensive form and the Senate's and President's preferences to form an expectation about the aggregate policy consequences of any possible power sharing arrangement. The reconciliation in our model represents that expectation.

While a reconciliation must make both conferees better off than the status quo, it may benefit one chamber far more than the other. Such asymmetric outcomes will occur when the status quo is much farther from one of the chamber's ideal point than it is to the other. In such cases, the "distant" chamber has less bargaining leverage. In effect, the algorithm reflects the equal rights that Article 1, Section 7 gives to each chamber, but allows reconciliations to be affected by bargaining power imbalances that may stem from other aspects of the legislative context.

The Constitutional Stage

Figure 2 depicts the extensive form of the game's constitutional stage. The House, the Senate and the President consider the reconciliation r_i under a closed rule (i.e., $L \in \{r_i, q\}$) where $r_i \in \Re^2$ denotes the reconciliation and the subscript i refers to the House faction that forged the reconciliation with the Senate (e.g., r_1 refers to an *F1*-Senate reconciliation). In what follows, we use the subscript on *r* only when referring to a reconciliation between the Senate and a specific House faction. Otherwise, we simply use *r*.

The reconciliation needs the support of two House factions (i.e., a majority) to pass in the constitutional stage. So, if two House factions and the Senate support the reconciliation, it goes to the President. Otherwise, the game ends with legislative outcome $L=q$. We assume that the House moves before the Senate. Since the model is one of complete information, this assumption is inconsequential.

[Figure 2 about here]

If the reconciliation makes it to the President, s/he can approve or reject it. If approved, the game ends with outcome $L=r$. In other words, the reconciliation becomes, from the perspective of House members bargaining in the power-sharing stage, the perceived aggregate legislative outcome.

A presidential rejection causes the game to continue. The game's final decision nodes represent the House and Senate's reaction to a rejection. If either chamber cannot generate sufficient support for an override, then $L=q$. If the override succeeds, then $L=r$. Following the constitutional requirements for a Congressional override of a presidential veto, an override in our model requires the support of 2/3 of the members of each chamber. We represent this requirement in different ways for the House and Senate.

For the House, an override requires the support of at least two-thirds of the membership. The support of two of the three factions may not be sufficient. Instead, the size of the factions supporting the override must be greater than or equal to two-thirds of the membership. For example, suppose that factions *F1* and *F3* support an override. The override has sufficient support only if $\%F1+\%F3\geq 2/3$.

For the Senate, we assume that all else constant, it is more difficult for it to support an override than it is to support a normal bill. We represent this increased difficulty by stating that the Senate supports an override if the reconciliation is *much* closer to its ideal point, *s*, than is the status quo (i.e., *r* must provide at least $v>0$ more utility to the Senate than *q*, where *v* is exogenous). In other words, a small change from *q* is not enough to elicit supermajority support in the Senate – an override requires that the reconciliation be substantially better for the Senate than the status quo. Our description of the game's extensive form is now complete.

Equilibrium Properties

Our conclusions come from a subgame perfect equilibrium whose existence and uniqueness is proven in the Appendix. In our model, a subgame-perfect Nash equilibrium consists of the following components: in the constitutional stage, players choose strategies that are best responses to the actions of all other players in this stage. In the reconciliation stage, the algorithm determines outcomes. In the power-sharing stage, House members choose strategies that are best responses to the actions of all other players, all of which are conditioned on common knowledge of the reconciliation algorithm and the belief that players will choose best responses in the constitutional stage. Because we draw our conclusion via backward induction on the game's extensive form, we describe properties of the equilibrium in the same order.

The first proposition describes focal properties of the game's final stage and produces a definition of a key concept, *the constitutional set.*

PROPOSITION 1 (The Constitutional Set)

The constitutional stage yields $L=r\neq q \Leftrightarrow$ *[s≠p and |s-q|-|s-r|>0 and |p-q|-|p-r|>0]* ***OR*** *[s=p and |s-q|-|s-r|>0 and (|Fj-q|-|Fj-r|>0 or |Fi-q|-|Fi-r|>0)]* ***OR*** *[s≠p and |p-q|-|p-r|≤0 and %P≤1/3 and |s-q|-|s-r|–v>0 and |Fi-q|-|Fi-r|>0]*.

In words, a new legislative outcome occurs if:

- the Senate and President have distinct ideal points and the two House factions that share their respective ideal points (here labeled *s* and *p*) prefer the reconciliation to the status quo, OR
- the Senate and the President share an ideal point, the House faction that shares their ideal point (here labeled *Fi*), and at least one other faction (here labeled *Fj≠Fi*) prefers the reconciliation to the status quo, OR
- the President prefers the status quo to the reconciliation, the size of the House faction that agrees with him (denoted *%P*) is not large enough to prevent an override (*%P<1/3*), the Senate prefers the reconciliation to the status quo so much that it will support an override, and the House faction that is aligned with neither the Senate nor the president also prefers the reconciliation.

Henceforth, we refer to the conditions of Proposition 1 as the *constitutional set* (CS). So, any player that wants to supplant the status quo with new legislation must produce a reconciliation that is in this set.

Is important to note that the CS *need not be compact*. The set of points that the President, the Senate, and a House majority prefer to the status quo need not overlap with the set of points that two-thirds of the Senate and two-thirds of the House prefer. Figure 3 offers an example. In it, *%F1 + %F2 > 2/3*. The CS is the union of the shaded areas. The black area represents the set of policies that the President, the Senate and a majority of House members prefer to the status quo. The gray area represents the set of policies for which the House and Senate will override a presidential rejection. The fact that these two areas are not connected alters the bargaining dynamics in an important way. Instead of choosing a point on a continuous one-dimensional policy space, actors in our model can use the threat of a very different kind of outcome, say the "override" subset of the CS, to increase their leverage in bargaining over alternatives in the CS's "presidential approval" subset. Substantively, non-compactness in the CS is a consequence of the fact that *laws can be made by two different kinds of coalitions* – a House majority/Senate majority/Presidential coalition *or* a House supermajority/Senate supermajority coalition. Introducing this fact into our model allows House bargaining in our model to be more dynamic than is commonly portrayed.

[Figure 3 about here]

We now characterize the reconciliation. Let mid_i be the midpoint of the line connecting *Fi*, the House conferee's ideal point and *s*, the Senate's ideal point. This point "splits the difference" between the chambers' ideal points and is the default reconciliation. By assumption, if $mid_i \in CS$, then $r_i = mid_i$. When $mid_i \notin CS$, the algorithm searches for the point closest to mid_i that is in the CS. Call this "second best" point, sec_i. Therefore, $r_i \in \{mid_i, sec_i\}$ denotes the reconciliation. The appendix includes a complete specification of the conditions under which each kind of reconciliation emerges.

The reconciliation's most important attribute is as follows. If we hold the ideal points of all House members constant, but move the ideal point of the President, the CS can change. When the CS changes, it can affect whether or not the midpoint between the ideal point of a House faction and the Senate is in the new CS. When the CS changes, so can the values of current and potential House power-sharing arrangements. Such changes can affect all factions' bargaining leverage. To see how, note that when *F1* and *F3* -- in the example above -- derive less utility from coalescing with each other, the relative value to each faction of coalescing with *F2* may increase. This shift can then result in *F2* gaining power as a consequence of a change in the

Senate or President. Such dynamics fuel our finding that changes in the Senate or President can influence the House's balance of power.

We now characterize equilibrium offers and responses in the power-sharing stage. Since our model joins a non-trivial algorithm to two distinctively structured bargaining games (a power-sharing game and a constitutional stage game), where each game allows a non-trivial number of possible relations between variables, the number of possible contingent relationships between variables in our model is quite large. Proving that the game yields a unique equilibrium at the power-sharing stage requires a full accounting of all such contingencies and makes the formal statement of power-sharing behaviors long and intricate. The appendix gives the full accounting. Here, we offer a more intuitive presentation. Consider the case where faction *F1* can make an offer to *F2* or *F3* (the logic underlying *F2*'s offers follows straightforwardly). A four-step sequence summarizes the logic of *F1*'s decision in equilibrium.

Step 1: Use the subgame following *F1*'s offer to determine consequences of rejecting it.

- For example, suppose that a rejection of *F1*'s offer would lead *F3* to accept *F2*'s subsequent offer which, in turn, yields outcome $L=r_2$ with probability c_2^3 and outcome $L=r_3$ with probability $1-c_2^3$.

Step 2: Determine which offers from *F1* each faction will accept.

- Continuing the example, *F2* and *F3* will only accept offers from *F1* if they provide at least as much utility as either would gain from *F3* accepting *F2*'s offer. For *F2* this amount is $-c_2^3|F2- r_2|-(1- c_2^3)|F2- r_3|$. For *F3* it is $-c_2^3|F3- r_2|-(1- c_2^3)|F3- r_3|$.

Step 3: Use step 1 information to calculate F1's maximum offer ($c^*{}_1^x$) to each other faction.

- Continuing the example, the utility consequence for *F1* of not making an acceptable offer is $-c_2^3|F1-r_2|-(1- c_2^3)|F1-r_3|$. If there exists an offer that makes *F1* better off and *F2* or *F*3 at least as well off if *F3* accepts *F2*'s offer, then *F1* will make an offer. The utility consequence of making offer $c^{*}{}_{1}^{2}$ to *F2*, if accepted, is $- c^{*}{}_{1}^{2}|F1-r_1|-(1- c^{*}{}_{1}^{2})|F1-r_2|$. The utility consequence of making offer $c^{*}{}_{1}^{3}$ to *F3*, if accepted, is $- c^{*}{}_{1}^{3}|F1- r_1|-(1- c^{*}{}_{1}^{3})|F1- r_3|$.

Step 4: Use the information in steps 2 and 3 to identify which offer maximizes F1's expected utility.

This final step has noteworthy implications for what follows. For example, a faction that does not have attractive alternative possibilities (e.g., a faction whose ideal point is very far from that of two factions whose ideal points are very close to one another) has less bargaining leverage. Therefore, if this "distant" faction is included in the power-sharing arrangement, it will be under unfavorable terms. Moreover, a faction need not prefer the arrangement that gives them the greatest share of power -- they may accept less power from a partner who can deliver far better legislative outcomes (see also Lupia and Strom 1995 and Kedar 2005 for related insights in the parliamentary context).

Implications: How Changes in the Senate or President affect House Bargaining

We now clarify how the Senate and President affect House bargaining. In the easiest case, suppose that the Senate, the President, and at least two House factions share the same ideal point, *F1*. The unique subgame perfect equilibrium implies legislative outcome $L = r_1 = r_2 = r_3 = F1$. In this case, all players are indifferent between all power-sharing arrangements because all produce the same outcome.

Power-sharing is more interesting in other cases. Generally speaking, we find that bargaining outcomes are *more than a function of the distances between the factions' ideal points.* The

Senate and President's preferences also affect the outcome. Proposition 2 states a necessary condition for changes in the Senate or President to affect House power-sharing.

> PROPOSITION 2. If changing the Senate or President alters the CS in a way that affects the value of at least one possible power-sharing arrangement (*F1-F2*, *F1-F3*, *F2-F3*), then it can cause a change in the arrangement chosen. Otherwise, such changes do not affect the House.

In words, it is possible to hold constant the ideal points of every member of the House, move the ideal point of the Senate or President, and alter the House's equilibrium power-sharing arrangement. Moving the Senate or President changes House factions' bargaining leverage only if the movements affect CS boundaries. Such boundary shifts matter when they change at least one faction's preferences about which factions represent the House in the reconciliation stage. Changes in such preferences can, in turn, affect which power-sharing offers factions are willing to make or accept. Even a change in one faction's preferences can have a ripple effect – as one faction changing what offers it is willing to make or accept can affect the bargaining leverage of all factions. When such changes in CS boundaries occur, shifts in the House's balance of power can result. Figure 4 gives an example.

[Figure 4 about here.]

The top of the figure depicts the initial conditions. In it, the President, the Senate, and House faction *F2* share the ideal point *(12, 12)*. The other House factions, *F1* and *F3*, have ideal points *(0, 24)* and *(30, 30)*, respectively. The status quo is *(24, 18)*. *F1* controls 40% of the House. *F2* and *F3* control 35% and 25% respectively. Factions engage in power-sharing negotiations knowing that the reconciliation resulting from an agreement between *F1* and the *Senate* would be $r_1=(6, 8)$, and the one resulting from an *F3*-Senate agreement would be $r_3=(21, 16)$, with both reconciliations being midpoints between the Senate's ideal point and that of the relevant House faction. Since the Senate and *F2* share an ideal point, that point -- $r_2=(12, 12)$ -- is the reconciliation that they would produce.

The outcome of this game is a power-sharing arrangement between *F1* and *F2*, where $c^{*}{}_{1}^{2} = 1$ (*F1* retains all governing power to decide the outcomes coming from the House) and $L = r_1 = (6,8)$. This allocation of power is sufficient to induce faction *F2* to coalesce with *F1*, rather than allowing power-sharing negotiations to continue. To see why, note that if *F1* thought that *F2* would reject this offer, *F1* could offer $c_1^3 = .09$ to *F3*, which is the minimal offer from *F1* that *F3* would accept. Since *F2*'s expected utility from this *F1-F3* arrangement is less than the utility from $L=(6,8)$, *F2* accepts *F1*'s offer. *F1*, in turn, makes an offer to *F2* because it prefers $L=(6,8)$ to the policy consequence of the compromise that would be necessary to gain *F3's* acceptance.

Now, suppose that the Senate's ideal point moves from *F2* to *F3*. All House factions' ideal points remain constant. As the bottom of Figure 4 shows, this move radically reshapes the CS. The change happens because *F3* now shares the Senate's preferences. Therefore, F3's preferences will constrain any possible reconciliation. *F2* remains aligned with the President. Since *F2* controls more than one-third of House members, it can prevent any override. Therefore, moving the Senate's ideal point from *F2* to *F3* reduces the CS to the intersection of the set of points that both *F2* and *F3* prefer to *q* – a very small set.

This shift in the Senate's ideal point causes House members to forge a new power sharing arrangement. The result is a coalition between *F1* and *F3*, where $c_1^3 = .58$. In other words, the game produces outcome $L = r_1 = (14.5, 20.5)$ with probability .58 and outcome $L = r_3 = (22.3, 17.9)$ with probability .42. This allocation of power is sufficient for *F3* to accept *F1's* offer. Were the game to continue, then *F2* would offer $c_2^3 = 1$, which would give *F2* total control. While that outcome would make *F3* at least as well off as accepting the status quo, *F1* can make *F3* marginally better off with the offer $c_1^3 = .58$ while making itself better off than it would be under an *F2-F3* arrangement. This new outcome represents a shift in the House power balance. Even though the policy preferences of all House members remained unchanged, *F3*, the faction that gained the Senate, is now much better off (it gained power and policy utility) while *F1* (which lost power and utility) and *F2* (which lost utility) are worse off.

Thus, the bargaining power of House members in the power-sharing stage is not independent of the game's reconciliation and constitutional stages. This lack of independence has important implications. One pertains to the ongoing debate about where power in the House truly lies. Where Krehbiel focuses on the median member of the House floor, Cox and McCubbins focus on the majority party leadership, and Aldrich and Rohde use the distribution of House member ideal points to explain the majority party-floor median power struggle, we go a step further. We add that such relations themselves depend deeply on constitutional relationship between the House, Senate, and President. A second example, depicted in Figure 5, shows this effect.

[Figure 5 about here]

The figure's top part depicts initial conditions. In it, the President and Senate share ideal point *(20, 34)* with House faction *F1*. Factions *F2* and *F3* have ideal points *(40, 0)* and *(0,0)*, respectively. *F1* controls 40% of House members, while *F2* and F3 control 20% and 40%, respectively. Two of the three possible reconciliations will be the midpoint of the line connecting the Senate's ideal point to that of the named faction -- $r_2=(30, 17.2)$, and $r_3=(10, 17.2)$. *F1* and the Senate share an ideal point, so $r_1=(20, 34)$ coincides with *F1*.

The outcome in this game is a power-sharing arrangement between factions *F1* and *F2*, where $c^{*}{}_1^2 = .15$. Hence, $L=r_1=(20, 34)$ with probability .15 and $L=r_2=(30, 17.2)$ with probability .85. This outcome is one where the majority party, *F1* and *F2*, has complete control of procedures. But the minority party is not irrelevant. To see why, note that if *F1* believed that *F2* would reject its offer, then *F1* could offer $c_1^3 = .15$ to *F3*, which *F3* would accept (because if *F3* were to reject the offer, *F2* would subsequently make an offer to *F3* where *F2* retained all power). When *F1* or *F2* can credibly threaten to share power with *F3*, the minority party's (*F3*'s) bargaining power influences the balance of power *within the majority party*.

Now suppose that we shift the President's ideal point from *F1* to *F3*. This case is depicted at the bottom of Figure 5. Here, r_1 *and* r_2 change, which alters the game's outcome. The new power-sharing arrangement is between *F1* and *F3*, where $c_1^3=1$ and $L=r_1=(11.5, 20)$. While *F1*, a faction of the majority party, retains all governing power, the minority party remains consequential. Not only did "gaining the presidency" shift the mass of the CS closer to *F3*'s ideal point, the shift also weakened *F2*'s bargaining position (it could no longer credibly threaten to coalesce with *F3*). As a result, F1 felt no pressure to compensate the "right-wing faction of its party" (F2) by allowing the legislative outcome to shift to the right with any positive probability. Hence, *F3* (whose ideal point is to the left) benefited. This example shows that understanding the extent of preference heterogeneity among House members *is necessary but not sufficient* to explain power relations in the House. A shift in the President's identity or in the Senate's partisanship can alter the balance of power between rival factions of the House's majority party.

Implications: The Timing of Procedural Changes

Our model implies that changes in the Senate or President should affect the timing of important changes within the House. This implication distinguishes the model from the focal theories listed at the outset of this paper, each of which implies that the timing of institutional changes depends solely on changes in the preferences of House members (though these theories disagree on which preferences –median of the floor, majority and minority party, intra and inter-party homogeneity levels – are most important).

In an extensive empirical evaluation, Sin (2008a) used our model as a basis for examining the timing of major rule changes in the House. She examined all sessions of Congress from 1879 to 2006 (46th Congress -109th Congress) in which there was no change in party control of the House from the previous term (a means of isolating analytic attention to cases where changes in the size of key House factions are likely to be limited). Of the 64 Congresses of that era, 51 met the criterion. Within that set of Congresses, she compares Houses in which there was a change in the Presidency or in the partisan control of the Senate to Houses in which no such change occurred. Existing theories predict no difference between the two sets of Houses regarding frequency of changes of major rules and procedures.[6] Our theory predicts a difference.

[Table 2 about here]

Sin finds that the proportion of Houses that pass significant alterations in rules or procedures is far higher following a change in the Senate or the President. Of the 28 Houses that featured changes in the Senate and/or President, 73% made a significant alteration. In the other 23 Houses where the Senate and President did not change, only 22% made such decisions. This is a large and significant difference. In other words, incorporating Senate and Presidential changes as implied by our model generates more reliable explanations of temporal variations in the House's allocation of power than did analyses that ignore these factors (see Sin 2007 for related work).

A representative example comes from the 1960s. Consider the presidential change from Dwight D. Eisenhower to John F. Kennedy in 1961. The election of Kennedy prompted an important redistribution of power in the House: the enlargement of the Rules committee. This enlargement changed the Rules committee's ideological composition "so conservative members

[6] She built a list of major changes in rules and procedures using data from Cox and McCubbins (2005), Schickler (2000) and Binder (1997).

could not kill the president's New Frontier program" (Oleszek 2001: 119). What is noteworthy about the timing of this procedural change is that neither the composition of the Senate nor the House changed much in 1960. For example, the DW-NOMINATE score for the Democratic median in the House was -.269 in the 86th Congress, before Kennedy's election, to -.261 in the 87th Congress when Kennedy became President.[7] Differences of similar magnitude hold for the House Republican Party and both parties in the Senate. So it is hard to explain this change to the Rules committee through reference to changing House member ideal points. Instead, it appears that the presidential change increased the bargaining leverage of Non-southern Democrats and altered what bargains they were willing to strike in the House's 1961 power sharing negotiations.

In a complementary case study on the revolt against Speaker Cannon in 1910, Sin (2008b) finds that the presidential change from progressive Theodore Roosevelt to conservative William H. Taft in 1909 explains the timing and scope of the revolt. She argues that the resulting change in the CS and the loss in policy utility for Progressive Republicans gave them an incentive to unite with Democrats and change the power sharing arrangement in the House. Changes in the membership of the House in the time leading up to the revolt were minimal. They are not sufficient to explain the timing of the revolt. Sin argues that where Progressive Republicans foresaw a particular set of policy outcomes when a progressive was President, the election of a conservative President meant that without a change in the House's allocation of power, policy outcomes would move to the right. To avoid such a move, the Speaker's former allies chose to diminish his powers. The change in the President explains the timing of their move.

Discussion: Does Multi-dimensionality Matter?

[7] For more information, see (http://voteview.com/pmediant.htm)).

Our incorporation of the Senate and President into a formal model of US lawmaking follows that of Krehbiel (1998). The key difference between our models is dimensionality. Krehbiel assumes that the policy space over which legislators negotiate is one-dimensional. Our model is two-dimensional.[8] Here, we will argue that the difference should be consequential *ex ante* and is consequential *ex post*.

It is well known, since at least Black (1948), that the position of the median voter *acts like a magnet* in unidimensional majoritarian bargaining games. This magnet is very powerful. It draws outcomes near it and gives the median voter maximum bargaining leverage. Such

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[8] As to whether the Congressional context is one-dimensional or not, we regard evidence against uni-dimensionality as being strong. Poole and Rosenthal (1997) have conducted an extensive examination of the dimensionality of legislative policy debates. Their work shows that that a single dimension cannot explain *all* legislative decisions. Even in cases where a single dimension can explain 97% of the observed variance, 97% is not 100%. This difference matters because the mathematics of spatial bargaining models is unforgiving about the non-existence of the median magnet when the policy space grows to multiple dimensions. This is true even if an added dimension is a minor factor. Plott's result shows that as long a second dimension has a non-zero impact on utility functions, "the magnet" almost never exists. Hence, empirical success rates of less than 100% do not constitute evidence of the magnet's existence. Unless one is willing to allocate *all* of the unexplained variance to noise in Poole and Rosenthal's data or errors in their analytic models, an assumption that their rigor works against, it is preferable to begin modeling by assuming multiple dimensions and then explicitly evaluate whether the multidimensionality does, or does not, affect the robustness of findings about bargaining that would emerge from a unidimensional version.

mechanics are present in Krehbiel (1998) as even when the Senate or President have veto powers, the median voter's ideal point is a magnet that draw outcomes towards it. Since Plott (1968), however, we know that when such games move to two or more dimensions, the magnet disappears unless extraordinary conditions are met. Its implication is that in many models, assuming uni-dimensionality *ex ante* is nearly equivalent to assuming that the median actor will be powerful (Aldrich, Rohde, and Grynaviski 1999).

Our approach entails deriving conclusions about the House without assuming that the magnet is present. While we can identify conditions under which median actors are powerful (e.g., by placing player ideal points in a straight line and assuming that their preferences are similar to that of the Senate ad President), we can also use the model to evaluate the extent to which such claims are robust to moving from uni-dimensionality to multiple dimensions or changing the Senate and President's ideal points. A final example provides such an evaluation.

[Figure 6 about here]

Figure 6.1 features an example where the three factions' ideal points lie on a single dimension. The median, *F2*, shares preferences with the Senate and the President. The outcome of this game is a power-sharing arrangement between *F1* and *F2*, where $c_1^2=0$ and $L=r_2=(10,0)$. In other words, the median House member retains all governing power and his ideal point is the legislative outcome. In this case, the floor median, *F2,* would never accept any offer that gave it less than full power.

What happens when we move to two-dimensions? In Figures 6.2 and 6.3, we move *F1* from *(7,0)* to *(7,6)*. *F2* is no longer the median of a one-dimensional line that connects all factions' ideal points. In Figure 6.2, the new outcome is a power-sharing arrangement between factions *F1* and *F3,* where $c^*{}_1^3 = .57$. Here, $L=r_1=(9, 1.9)$ with probability .57 and $L=r_3=(12, 0)$

with probability .43. In Figure 6.3, the new outcome is also an *F1-F3* pairing, where $c^{*}{}_{1}^{3}=.53$ and $L=r_1=(7, 6)$ with probability .53 and $L=r_3=(12.5, 3.5)$ with probability .47. In both cases, *F2*'s policy utility and power are much reduced.

The difference between Figures 6.2 and 6.3 is the location of the Senate and the President. In Figure 6.2, *F2* remains in the same faction as the Senate and President. Their continuing support limits *F2*'s loss in policy utility. In Figure 6.3, the Senate and President now share ideal points with *F1*. With this change, the utility loss for *F2* is far greater than in Figure 6.2. In other words, what happens to the "median House member" (*F2*) of Figure 6.1 is a function not only of dimensionality but is also dependent on the location of the Senate and President.

Were we to restrict our model to one dimension, we could easily generate cases in which median actors' ideal points act as magnets that pull outcomes as close as the Senate and President will allow. Without the restriction, we can use our model to show that such dynamics are not generally robust to the introduction of a second policy dimension. When a second dimension is included, the CS can take on many shapes – some of which are not compact – and many of which alter bargaining dynamics and outcomes within the House.

Conclusion

If House members are rational, foresighted and policy-oriented, then they have an incentive to integrate implications of key constitutional requirements into their internal power allocation decisions. A consequence of such incentives is that changes in the President or Senate affect the timing of changes in the chamber's power-sharing arrangements. While many contemporary explanations of power allocation in the House assume that changes in the President or Senate do not affect the timing of changes in the balance of power in the House, our work suggests otherwise. We find that a change in the ideological perspective of the Senate or the identity of President can alter House members' expectations about the consequences of allocating power in certain ways. These altered expectations, in turn, can change the bargains that House members are willing to strike with one another when allocating power. Therefore, our work suggests that when attempting to explain the timing of power allocations made by the House under the Constitution’s Article I, Section 5, it is important to take account of the incentives created by Article I, Section 7.

Appendix

Proof of Proposition 1. By backward induction.

Lemma 1. The outcome of the override subgame is $L=r \Leftrightarrow s\neq p$ and $\%P\leq 1/3$ and $min(|s\text{-}q|\text{-}|s\text{-}r|\text{–}v,\ |z\text{-}q|\text{-}|z\text{-}r|) > 0$. Otherwise, $L=q$.

Proof. Supermajorities in the House and Senate must agree to override a rejection. In the House, 2/3 of the membership must support an override. In the Senate, we represent supermajority support for an override as the requirement that the reconciliation, *r*, be at least distance *v* closer to *s* than the status quo *q* is to *s*.

Reaching the override subgame implies that the President previously rejected *r*. This fact has an implication for the feasibility of an override. Let $p\in\{F1,F2,F3\}$ be the president's ideal point and *%P* be the percentage of House members who are from the President's faction. Since no group has a majority of House seats, $\%P\in[0, .5]$. Since the President preferred *q* to *r*, this faction has the same preference by definition. Therefore, if $\%P>1/3$, the House will not override the rejection and the legislative outcome is $L=q$.

Now suppose $s=p$ - - the Senate and the President are from the same faction. Since getting to the override stage implies that the President preferred *q* to *r*, the Senate must have the same preference. Therefore, the Senate will not override the rejection and the legislative outcome is $L=q$.

The remaining case is $s\neq p$ and $|s\text{-}q|\text{-}\ |s\text{-}r|\text{-}\ v>0$ and $\%P\leq 1/3$. Here, the Senate votes to override the rejection. Let *%S* denote the percentage of House members who are from the same faction as the Senate, where $\%S\in[0, .5]$. Since the Senate previously approved *r*, as a necessary condition for reaching the constitutional stage, it must be that $|s\text{-}q|\text{-}|s\text{-}r|>0$. Therefore, *%S* of the House also prefers *r* to *q*. Since $\%P\leq 1/3$ of House members will not support an override and *%S*

$\leq .5$ will support it, the remaining faction is pivotal with respect to an override. As in the text's presentation of Proposition 1, let $Fi \neq s \neq p \in \{F1, F2, F3\}$ denote that faction (i.e., House members who are from a different faction than either the Senate or the president), where $\%Fi$ refers to the size of that faction in the House and $\%P+\%S+\%Fi=1$. Then, if this faction prefers r to q (i.e., $|Fi-q|-|Fi-r|>0$), then the rejection is overridden. *QED.*

Lemma 2. The outcome of the presidential subgame is $L=r \Leftrightarrow |p-q|-|p-r|>0$ OR [$|p-q|-|p-r|\leq 0$ and $\%P\leq 1/3$ and $|s-q|-|s-r|-v>0$ *and* $|Fi-q|-|Fi-r|>0$]. Otherwise, $L=q$.

Proof. First, we need a way of describing what the President will do when the House and Senate will override a rejection. In such cases, the President's choice is inconsequential to the game's legislative outcome, $L=r$. For this purpose, let $\pi_p \in \{-\infty, \infty\}$ represent the President's public stance in conditions where he anticipates an override. $\pi_p>0$ represents cases where even though the President cannot affect the legislative outcome in the game's constitutional stage, s/he wants to be seen approving r. $\pi_p<0$ represents cases where, s/he prefers to be seen opposing r. This term does not affect our results, but does allow behavioral predictions when the President's choice does not affect the final outcome.

If the president anticipates an override, then the relevant utilities are $U_p(q,\pi_p) = -|p-r|$ and $U_p(r,\pi_p) = -|p-r|+\pi_p$. If $\pi_p>0$, then the president chooses r. If $\pi_p \leq 0$, then the president chooses q. If a rejection will not be overridden, then the relevant utilities are $U_p(q) = -|p-q|$ and $U_p(r) = -|p-r|$. If $|p-q|-|p-r|>0$, then the president chooses r. If $|p-q|-|p-r|\leq 0$, then he or she chooses q. By implication,

- If $s\neq p$ and $\%P\leq 1/3$ and $min(|s-q|-|s-r|-v, |Fi-q|-|Fi-r|) > 0$ and $\pi_p>0$, then the president approves r under threat of override and the game ends with $L=r$.

- If $s \neq p$ and $\%P \leq 1/3$ and $min(|s\text{-}q|\text{-}|s\text{-}r|–v,\ |Fi\text{-}q|\text{-}|Fi\text{-}r|) > 0$ and $\pi_p \leq 0$, then the president rejects *r* under threat of override and the game goes to the override stage (where the rejection is overridden).

- If [$s=p$ or $\%P>1/3$ or $max(|s\text{-}q|\text{-}|s\text{-}r|–v,\ |Fi\text{-}q|\text{-}|Fi\text{-}r|) \leq 0$] and $|p\text{-}q|\text{-}|p\text{-}r| > 0$, then the president approves *r* with no override threat and the game ends with $L=r$.

- If [[$s=p$ or $\%P>1/3$ or $max(|s\text{-}q|\text{-}|s\text{-}r|–v,\ |Fi\text{-}q|\text{-}|Fi\text{-}r|) \leq 0$] and $|p\text{-}q|\text{-}|p\text{-}r| \leq 0$], then the president rejects *r* and the game goes to the override stage (where the rejection survives). *QED.*

Lemma 3. The outcome of the Senate subgame is $L=r \Leftrightarrow$ [$|s\text{-}q|\text{-}|s\text{-}r|>0$ and $|p\text{-}q|\text{-}|p\text{-}r|>0$] OR [$|p\text{-}q|\text{-}|p\text{-}r|\leq 0$ and $\%P\leq 1/3$ and $|s\text{-}q|\text{-}|s\text{-}r|–v>0$ and $|Fi\text{-}q|\text{-}|Fi\text{-}r|> 0$]. Otherwise, $L=q$.

Proof. Let $\pi_S \in \{-\infty,\infty\}$ represent the Senate's public stance in conditions where it anticipates that the President will reject *r* and it will stand. For the Senate, the relevant utilities are $U_s(q) = -\ |s\text{-}q|$, $U_s(r) = -\ |s\text{-}r|$ if $L=r$ is the outcome of the presidential subgame just described, and $U_s(r) = -\ |s\text{-}q|+\pi_S$ if $L=q$ is the outcome of the subgame.

If $L=q$ is the outcome of the presidential subgame and $\pi_S>0$, the Senate approves *r*. If $\pi_S\leq 0$, the Senate defeats *r*. If $L=r$ is the outcome of the presidential subgame and $|s\text{-}q|\text{-}\ |s\text{-}r|>0$, then the Senate approves *r*. But if $|s\text{-}q|\text{-}\ |s\text{-}r|\leq 0$, then the Senate defeats *r*. *QED.*

We complete the proof of Proposition 1 by examining House factions' constitutional stage decisions. Let $\pi_i \in \{-\infty,\infty\}$ represent *Fi*'s ($i \in \{1,2,3\}$) public stance in conditions where it anticipates a rejection that will stand. For *Fi*, the relevant utilities are $U_i(q) = -\ |Fi\text{-}q|$, $U_i(r) = -\ |Fi\text{-}r|$ if $L=r$ is the outcome of the Senate subgame, and $U_i(r) = -\ |Fi\text{-}q|+\pi_i$ if $L=q$ is the outcome of the Senate subgame. If $L=q$ is the outcome of the Senate subgame, or if $|Fj\text{-}q|\text{-}\ |Fj\text{-}r|>0$ for House factions $Fj \neq Fi$ ($j \in \{1,2,3\}\backslash i$), then if $\pi_i>0$, then Fi votes for *r*. If $\pi_i\leq 0$, Fi votes against *r*. If

$L=r$ is the outcome of the Senate subgame, then if $|Fi-q|- |Fi-r|>0$, then Fi approves r and if $|Fi-q|- |Fi-r|\leq 0$, then Fi votes against r.

Two of the three factions must approve r for the game to proceed to the Senate subgame. A necessary condition for $L=r$ in Lemma 3 is $|s-q|-|s-r|>0$. If this condition is satisfied, then the House faction whose members are from the same ideological group as the Senate also support r by definition -- therefore, only one other group's support is needed. Let $Fi\neq s$ be such a faction. Then, the House supports r if [$s\neq p$ and $\%P\leq 1/3$ and $min(|s-q|-|s-r|-v, |Fi-q|-|Fi-r|)>0$]. In the case, $s=p$, let $Fj\neq Fi\neq s=p \in \{F1, F2, F3\}$ denote the set of House members who are not in faction Fi and not in the faction that shares the Senate and the President's ideal point. Fj is pivotal in the case [$s=p$ *and* $|s-q|-|s-r|>0$ *and* $|Fi-q|-|Fi-r|\leq 0$], which completes all contingencies described in the proposition. *QED*.

Reconciliation Stage

For any set of ideal points, the reconciliation algorithm yields the following r:

- $r_i= mid_i \Leftrightarrow$ *[*$|s-q|-|s-mid_i|>0$ *and* $|p-q|-|p-mid_i|>0$ *and* $s\neq p$*]* ***OR*** *[*$s=p$ *and* $|s-q|-|s-mid_i|>0$ *and (*$|Fj-q|-|Fj-mid_i|>0$ *or* $|Fi-q|-|Fi-mid_i|>0$*)]* ***OR*** *[*$|p-q|-|p-mid_i|\leq 0$ *and* $\%P\leq 1/3$ *and* $|s-q|-|s-mid_i|-v>0$ *and* $|Fi-q|-|Fi-mid_i|>0$*]*
- $r_i=sec_i \Leftrightarrow$ **[**$|s-q|-|s-mid_i|\leq 0$ **OR** *[*$s=p$ *and* $|s-q|-|s-mid_i|>0$ *and* $|Fj-q|-|Fj-mid_i|\leq 0$ *and* $|Fi-q|-|Fi-mid_i|\leq 0$*]* **OR** *[*$|s-q|-|s-mid_i|>0$ *and* $|p-q|-|p-mid_i|\leq 0$ and ($\%P>1/3$ or $|s-q|-|s-mid_i|-v\leq 0$ *or* $|Fi-q|-|Fi-mid_i|)\leq 0)$*]***] AND [***[*$|s-q|-|s-sec_i|>0$ *and* $|p-q|-|p-sec_i|>0$ *and* $s\neq p$*]* ***OR*** *[*$s=p$ *and* $|s-q|-|s-sec_i|>0$ *and (*$|Fj-q|-|Fj-sec_i|>0$ *or* $|Fi-q|-|Fi-sec_i|>0$*)]* ***OR*** *[*$|p-q|-|p-sec_i|\leq 0$ *and* $\%P\leq 1/3$ *and* $|s-q|-|s-sec_i|-v>0$ *and* $|Fi-q|-|Fi-sec_i|>0$*]***]**.

- $r_i=q \Leftrightarrow |s\text{-}q|\text{-}|s\text{-}sec_i|\leq 0$ **OR** *[s=p and* $|s\text{-}q|\text{-}|s\text{-}sec_i|>0$ *and* $|Fj\text{-}q|\text{-}|Fj\text{-}sec_i|\leq 0$ *and* $|Fi\text{-}q|\text{-}|Fi\text{-}sec_i|\leq 0]$ **OR** $[|s\text{-}q|\text{-}|s\text{-}sec_i|>0$ *and* $|p\text{-}q|\text{-}|p\text{-}sec_i|\leq 0$ and ($\%P>1/3$ or $|s\text{-}q|\text{-}|s\text{-}sec_i|-v\leq 0$ *or* $|Fi\text{-}q|\text{-}|Fi\text{-}sec_i|)\leq 0.)]$

Power-sharing Stage

Again, we proceed by backward induction.

<u>F3's reaction to F2's offer</u>

At this decision node, the consequence of *F2* failing to make an acceptable offer is $L=q$. *F3* will accept offer c_2^3 if and only if $-c_2^3|F3\text{-}r_2| - (1\text{-} c_2^3)|F3 - r_3| \geq \text{-}|F3\text{-}q|$. This means that if *F2* wants to coalesce with *F3*, it must offer

- $c_2^3 \geq [|F3 - r_3| \text{-}|F3\text{-}q|]/[(|F3 - r_3|\text{-}|F3\text{-}r_2|)]$ if $|F3 - r_3|>|F3\text{-}r_2|$
- $c_2^3 \leq [|F3 - r_3| \text{-}|F3\text{-}q|]/[(|F3 - r_3|\text{-}|F3\text{-}r_2|)]$ if $|F3 - r_3|<|F3\text{-}r_2|$
- *If* $|F3 - r_3|=|F3\text{-}r_2|$, *F3* will accept any offer by the tie-breaking rule and the fact that r_3 is at least as close to *F3* as is *q* (by definition of the reconciliation algorithm).

Two lemmas simplify the specification of further steps in the backward induction process.

Lemma 4. If $|F3\text{–}r_3|\geq|F3\text{-}r_2|$, then *F3* will accept any offer from *F2.*

Proof. Since r_3 is at least as close to *F3* as is *q* (by the reconciliation definition), $|F3\text{–}r_3|\text{-}|F3\text{-}q|\leq 0$, $(|F3\text{–}r_3|\text{-}|F3\text{-}q|)/(|F3\text{–}r_3|\text{-}|F3\text{-}r_2|)$ is non-positive. Since, $c_2^3\in[0,1]$ the condition is satisfied for any c_2^3. *QED.*

Lemma 5. Two factions cannot strictly prefer one another's reconciliations simultaneously.

Proof. Consider two factions $A,B \in\{F1,F2,F3\}$. r_A and r_B are the points in *CS* that are closest to the midpoint of the line connecting *A* and *s* and *B* and *s*, respectively. Either $A=s$ or $B=s$ or neither *A* nor *B* equal *s*. Let $A=s$. By the definition of a reconciliation, the midpoint of the line connecting *A* and *s* is *s*. Therefore, r_A is the point in CS that is closest to *A*. Hence *A* prefers r_A to any other reconciliation. By identical logic, *B* prefers r_B to any other reconciliation when $B=s$. Now suppose that neither *A* nor *B* equal *s*. Then, if r_A is closer to *B* than is r_B and if r_A is the closest point in *CS* to the midpoint of *s* and *A*, then *A* must be further from *s* than *B*. If *A* is further from *s* than *B*, and r_B is closer to s then r_A, then r_B cannot be closer to *A* than is r_A. Therefore, *B* cannot prefer r_A when *A* strongly prefers r_B. *QED*.

F2's offer

F2's chooses a value of c_2^3 that maximizes its utility subject to three constraints. One constraint is $c_2^3 \in [0,1]$. The second (acceptability) constraint is that *F3* will accept it. The parameters of this constraint are listed under "*F3*'s reaction to *F2*'s offer" and Lemma 4. The third constraint pertains to incentive compatibility. Since, *F2* can prefer *q* to r_3, there exist values of c_2^3 that, if accepted, will make *F2* worse off than if *F3* rejects. Therefore, *F2*'s incentive constraint is $U_2(c_2^3, F3\ accepts) = -c_2^3|F2-r_2| - (1-c_2^3)|F2-r_3| \geq U_2(c_2^3, F3\ rejects) = -|F2-q|$.

No acceptable offer assumption (NAO). We assume, without a loss of generality, that if no offer in $c_x^y \in [0,1]$ satisfies the acceptability constraint for any relevant *Fy*, then *Fx* offers $c_x^y=1$ if $|Fx - r(Fy,s)| \geq |Fx - r(Fx,s)|$ and offers $c_x^y=0$, otherwise.

Lemma 6. *F2's* offer and *F3's* response are as follows:

- **If $min(|F3-r_3|-|F3-r_2|, |F2-r_3|-|F2-r_2|) \geq 0$, then $c_2^3=1$ and *F3* accepts.**
- **If $|F2-r_3| \leq |F2-r_2|$, then $c_2^3=0$ and *F3* accepts.**
- **If $|F2-r_3|-|F2-r_2|>0>|F3-r_3|-|F3-r_2|$ and $min([|F3-r_3|-|F3-q|]/[|F3-r_3|-|F3-r_2|],1) \geq (|F2-q|-|F2-r_3|)/(|F2-r_2|-|F2-r_3|)$, then $c_2^3 = min([|F3-r_3|-|F3-q|]/[|F3-r_3|-|F3-r_2|],1)$ and *F3* accepts.**
- **If $|F2-r_3|-|F2-r_2|>0>|F3-r_3|-|F3-r_2|$ and $min([|F3-r_3|-|F3-q|]/[|F3-r_3|-|F3-r_2|],1) < (|F2-q|-|F2-r_3|)/(|F2-r_2|-|F2-r_3|)$, then $c_2^3 = 1$ and *F3* rejects.**

Proof. In the first bulleted case, *F3* prefers r_2 to r_3, so the acceptability constraint is not binding. Since $|F2 – r_3|>|F2-r_2|$, $max\ U_2(c_2^3)=1$. In the second bulleted case, *F2* prefers r_3 to r_2. Since$|F2 – r_3|-|F2-r_2|<0$, $max\ U_2(c_2^3)=0$. If $|F3 – r_3|<|F3-r_2|$, *F3* accepts the offer because it shares *F2*'s preferences over other reconciliations. Since $|F2 – r_3|\leq|F2-r_2|$, Lemma 5 renders $|F3 – r_3|>|F3-r_2|$ impossible. In the third and fourth bullets, each faction prefers its own reconciliation. Since$|F2–r_3|-|F2-r_2|>0$, $max\ U_2(c_2^3)=1$. However, *F3*'s acceptability constraint is binding. In the third bullet, $\exists\ c_2^3\in[0,1]$ that satisfies the acceptability and incentive compatibility constraints, so *F2* offers the largest value of c_2^3 that *F3* will accept. In the fourth bullet, there exists no such offer, so $c_2^3=1$ by the NAO assumption. *QED.*

F2 and F3's response to F1's offer

There are four cases to consider. Note that with respect to acceptability constraints, the cases $c_2^3=0$ and $c_2^3=1$ are mirror images of one another.

- If $|F2 – r_3|-|F2-r_2|>0>|F3 – r_3|-|F3-r_2|$, and $min([|F3 – r_3|-|F3-q|]/[|F3 – r_3|-|F3-r_2|],1)\geq(|F2-q|-|F2-r_3|)/ (|F2-r_2|-|F2-r_3|)$ then the policy consequence of rejecting *F1*'s offer stems from $c_2^3=min([|F3–r_3|-|F3-q|]/[|F3–r_3|-|F3-r_2|], 1)$.
    - *F2* acceptability constraint: If $|F2 – r_2|\geq|F2-r_1|$, accept any offer. If $|F2 – r_2|<|F2-r_1|$ then *F1* must offer $c_1^2\leq[(1-c_2^3)(|F2–r_2| - |F2 – r_3|)] / (|F2 – r_2|–|F2-r_1|)$.
    - *F3* acceptability constraint: If $|F3 – r_3|\geq|F3-r_1|$, accept any offer. If $|F3 – r_3|<|F3-r_1|$, then F1 must offer $c_1^3\leq\ c_2^3(|F3–r_3|-|F3-r_2|)/(|F3 – r_3|–|F3-r_1|)$.
- If $|F2 – r_3|-|F2-r_2|>0>|F3 – r_3|-|F3-r_2|$, and $min([|F3 – r_3|-|F3-q|]/[|F3 – r_3|-|F3-r_2|],1)<(|F2-q|-|F2-r_3|)/ (|F2-r_2|-|F2-r_3|)$ then the policy consequence of rejecting *F1*'s offer is $L=q$ *(i.e.,* $c_2^3=1$ *and F3 rejects).*

- $F2$ acceptability constraint: If $|F2 - r_2| \geq |F2-r_1|$, accept any offer. If $|F2 - r_2| < |F2-r_1|$, then F1 must offer $c_1^2 \leq [|F2 - r_2|-|F2-q|]/[|F2 - r_2|-|F2-r_1|]$
- $F3$ acceptability constraint: If $|F3 - r_3| \geq |F3-r_1|$, accept any offer. If $|F3 - r_3| < |F3-r_1|$, then F1 must offer $c_1^3 \leq [|F3 - r_3|-|F3-q|]/[|F3 - r_3|-|F3-r_1|]$

- If $min(|F3-r_3|-|F3-r_2|, |F2-r_3|-|F2-r_2|) \geq 0$, then the policy consequence of rejecting $F1$'s offer is $L=r_2$ *(i.e.,* $c_2^3=1$ *and F3 accepts).*
  - $F2$ acceptability constraint: If $|F2-r_2| \geq |F2-r_1|$, accept any offer. If $|F2-r_2| < |F2-r_1|$, reject any offer $c_1^2>0$.
  - $F3$ acceptability constraint: If $|F3-r_3| > |F3-r_1|$, then $F1$ must offer $c_1^3 \geq (|F3-r_3|-|F3-r_2|)/(|F3-r_3|-|F3-r_1|)$. If $|F3-r_1| \geq |F3-r_3| \geq |F3-r_2|$, then reject any offer. If $|F3-r_3|=|F3-r_1|=|F3-r_2|$, then accept any offer.
- If $|F2 - r_3| \leq |F2-r_2|$, then the policy consequence of rejecting $F1$'s offer is $L=r_3$ *(i.e.,* $c_2^3=0$ *and F3 accepts).*
  - $F2$ acceptability constraint: If $|F2 - r_2| > |F2-r_1|$, then $F1$ must offer $c_1^2 \geq (|F2 - r_2| - |F2-r_3|)/(|F2 - r_2|-|F2-r_1|)$. If $|F2 - r_1| \geq |F2-r_2| > |F2-r_3|$, then reject any offer. If $|F2 - r_2|=|F2-r_1|=|F2-r_3|$, then accept any offer.
  - $F3$ acceptability constraint: If $|F3 - r_3| \geq |F3-r_1|$, accept any offer. If $|F3 - r_3| < |F3-r_1|$, reject any offer $c_1^3>0$.

<u>F1's offer</u>

F1's chooses to make an offer that maximizes its utility subject to three constraints. One constraint is $\{c_1^2, c_1^3\} \in [0,1]$. The second (acceptability) constraint is that $F2$ or $F3$ will accept it. A third constraint is incentive compatibility. This constraint is $min\ (U_1(c_1^2, F2\ accepts), U_1(c_1^3, F3\ accepts)) \geq U_1(offer\ rejected)$, where $U_1(c_1^2, F2\ accepts) = -c_1^2|F1-r_1| - (1- c_1^2)|F1 - r_2|$,

$U_1(c_1^3, F3\ accepts) = -c_1^3|F1\text{-}r_1| - (1\text{-}\ c_1^3)|F1 - r_3|$ and then $U_1(offer\ rejected)$ depends on the consequence of *F2*'s offer to *F3*. Below, we determine *F1*'s offer with respect to the four mutually exclusive and collectively exhaustive consequences listed in Lemma 6.

Case 1. If $|F2 - r_3|\text{-}|F2\text{-}r_2|>0>|F3–r_3|\text{-}|F3\text{-}r_2|$ and $min([|F3 - r_3|\text{-}|F3\text{-}q|]/[|F3 - r_3|\text{-}|F3\text{-}r_2|],1)\geq(|F2\text{-}q|\text{-}|F2\text{-}r_3|)/ (|F2\text{-}r_2|\text{-}|F2\text{-}r_3|)$, then the consequence of a failed offer from F1 is: $c_2^3= min([|F3 - r_3|\ \text{-}|F3\text{-}q|]/[|F3 - r_3|\text{-}|F3\text{-}r_2|],1)$ and *F3* accepts.

This case has four collectively exhaustive subcases, A-D.

A. If $|F2 - r_2|\geq|F2\text{-}r_1|$ and $|F3 - r_3|\geq|F3\text{-}r_1|$, *F2* and *F3* will accept any offer.

So, if $|F2 - r_2|\geq|F2\text{-}r_1|$ and $|F3 - r_3|\geq|F3\text{-}r_1|$ and $|F1\text{-}r_1| \leq min(|F1\text{-}r_2|, |F1\text{-}r_3|)$, then $c_1^2=1$ and *F2 accepts*. If $|F2 - r_2|>|F2\text{-}r_1|$, Lemma 5 renders $|F1\text{-}r_2|<|F1\text{-}r_1|$ impossible. If $|F2 - r_2|=|F2\text{-}r_1|$ and $|F3 - r_3|\geq|F3\text{-}r_1|$ and $|F1\text{-}r_2|<|F1\text{-}r_1|$ and $|F1\text{-}r_2|\leq |F1\text{-}r_3|$, then $c_1^2=0$ and *F2 accepts*. If $|F3 - r_3|>|F3\text{-}r_1|$, Lemma 5 renders $|F1\text{-}r_3|<|F1\text{-}r_1|$ impossible. And if $|F2 - r_2|\geq|F2\text{-}r_1|$ and $|F3 - r_3|=|F3\text{-}r_1|$ and $|F1\text{-}r_3| < min(|F1\text{-}r_1|, |F1\text{-}r_2|)$, then $c_1^3=0$ and *F3 accepts*.

B. If $|F2 - r_2|\geq|F2\text{-}r_1|$ and $|F3 - r_3|<|F3\text{-}r_1|$, *F2* will accept any offer.

So, if $|F2 - r_2|\geq|F2\text{-}r_1|$ and $|F3 - r_3|<|F3\text{-}r_1|$ and $|F1\text{-}r_1| \leq min(|F1\text{-}r_2|, |F1\text{-}r_3|)$, then $c_1^2=1$ and *F2 accepts*. If $|F2 - r_2|>|F2\text{-}r_1|$, Lemma 5 renders $|F1\text{-}r_2| < |F1\text{-}r_1|$ impossible. If $|F2 - r_2|=|F2\text{-}r_1|$ and $|F3 - r_3|<|F3\text{-}r_1|$ and $|F1\text{-}r_2| < |F1\text{-}r_1|$ and $|F1\text{-}r_2|\leq |F1\text{-}r_3|$, then $c_1^2=0$ and *F2 accepts*. If $|F2 - r_2|\geq|F2\text{-}r_1|$ and $|F3 - r_3|<|F3\text{-}r_1|$ and $|F1\text{-}r_3| < min(|F1\text{-}r_1|, |F1\text{-}r_2|)$, then $c_1^3=0$ and *F3 accepts*.

C. If $|F2 - r_2|<|F2\text{-}r_1|$ and $|F3 - r_3|\geq|F3\text{-}r_1|$, *F3* will accept any offer.

So, if $|F2 - r_2|<|F2\text{-}r_1|$ and $|F3 - r_3|\geq|F3\text{-}r_1|$ and $|F1\text{-}r_1| \leq min(|F1\text{-}r_2|, |F1\text{-}r_3|)$, then $c_1^3=1$ and *F3 accepts*. If $|F2 - r_2|<|F2\text{-}r_1|$ and $|F3 - r_3|\geq|F3\text{-}r_1|$ and $|F1\text{-}r_2| < min(|F1\text{-}r_1|, |F1\text{-}r_3|)$, then $c_1^2=0$ and *F2 accepts*. If $|F3 - r_3|>|F3-r_1|$, Lemma 5 renders $|F1-r_3|<|F1-r_1|$ impossible. If $|F2 - r_2|<|F2-r_1|$ and $|F3 - r_3|=|F3-r_1|$ and $|F1-r_3| < min(|F1-r_1|, |F1-r_2|)$, then $c_1^3=0$ and *F3 accepts*.

D. If $|F2 - r_2|<|F2-r_1|$ and $|F3 - r_3|<|F3-r_1|$, *F2* and *F3* require minimum power shares to enter agreements. For notational simplicity, let $c^{*3}_{2}= min\{[|F3 - r_3| -|F3-q|]/[|F3 - r_3|-|F3-r_2|],1\}$, $M_1^2(c^{*3}_{2})=min\{(1- c^{*3}_{2})((|F2-r_3|-|F2-r_2|)/(|F2-r_1|-|F2-r_2|)),1\}$ and $M_1^3(c^{*3}_{2})= min\{c^{*3}_{2}((|F3-r_2|-|F3-r_3|)/(|F3-r_1|-|F3-r_3|)),1\}$. The last two terms are the minimal acceptable offer for the case where all three factions most prefer their own faction's reconciliation, *r*.

So, if $|F2 - r_2|<|F2-r_1|$ and $|F3 - r_3|<|F3-r_1|$ and $|F1-r_1| < min(|F1-r_2|, |F1-r_3|)$, and

- $M_1^2(c^{*3}_{2})|F1-r_1|+(1- M_1^2(c^{*3}_{2}))|F1-r_2|\leq min(c^{*3}_{2}|F1-r_2|+(1- c^{*3}_{2})|F1-r_3|, M_1^3(c^{*3}_{2})|F1-r_1|+(1- M_1^3(c_2^3))|F1-r_3|)$, then $c_1^2= M_1^2(c^{*3}_{2})$ and *F2 accepts.*
- $M_1^3(c^{*3}_{2})|F1-r_1|+(1- M_1^3(c^{*3}_{2}))|F1-r_3|< M_1^2(c^{*3}_{2})|F1-r_1|+(1- M_1^2(c^{*3}_{2}))|F1-r_2|$ and $M_1^3(c^{*3}_{2})|F1-r_1|+(1- M_1^3(c^{*3}_{2}))|F1-r_3|\leq c^{*3}_{2}|F1-r_2|+(1- c^{*3}_{2})|F1-r_3|$, then $c_1^3= M_1^3(c^{*3}_{2})$ and *F3 accepts.*
- $c^{*3}_{2}|F1-r_2|+(1- c^{*3}_{2})|F1-r_3|<min([M_1^2(c^{*3}_{2})|F1-r_1|]+[(1- M_1^2(c^{*3}_{2}))|F1-r_2|], [M_1^3(c^{*3}_{2})|F1-r_1|]+[(1- M_1^3(c^{*3}_{2}))|F1-r_3|])$, then $c_1^2=0$ and *F2 rejects.*

If $|F2 - r_2|<|F2-r_1|$ and $|F3 - r_3|<|F3-r_1|$ and $|F1-r_2|<|F1-r_1|$ and $|F1-r_2|\leq |F1-r_3|$, then $c_1^2=0$ and *F2 accepts*. And If $|F2 - r_2|<|F2-r_1|$ and $|F3 - r_3|<|F3-r_1|$ and $|F1-r_3|<min(|F1-r_1|, |F1-r_2|)$, then $c_1^3=0$ and *F3 accepts.*

<u>Case 2: If $|F2 - r_3|-|F2-r_2|>0>|F3-r_3|-|F3-r_2|$ and $min([|F3 - r_3|-|F3-q|]/[|F3 - r_3|-|F3-r_2|],1)<(|F2-q|-|F2-r_3|)/ (|F2-r_2|-|F2-r_3|)$, then the consequence of a failed offer from *F1* is $L=q$ (i.e., $c_2^3= 1$and *F3* rejects).</u>

This case has the same four subcases as case 1. The first three subcases of case 2 are identical to subcases A, B, and C of case 1. Let $M_1^2(q)=min((|F2\text{-}r_2|\text{-}|F2\text{-}q|)/(|F2\text{-}r_2|\text{-}|F2\text{-}r_1|), 1)$ and let $M_1^3(q)$ be defined analogously. These terms are the minimal acceptable offer for the case where all three factions most prefer their own faction's reconciliation, *r*.

D'. If $|F2 - r_2|<|F2\text{-}r_1|$ and $|F3 - r_3|<|F3\text{-}r_1|$, *F2* and *F3* require minimum power shares to enter agreements.

So if $|F2 - r_2|<|F2\text{-}r_1|$ and $|F3 - r_3|<|F3\text{-}r_1|$ and $|F1\text{-}r_1| < min(|F1\text{-}r_2|, |F1\text{-}r_3|)$, and

- $M_1^2(q)|F1\text{-}r_1|+(1\text{-} M_1^2(q))|F1\text{-}r_2|\leq min(|F1\text{-}q|, M_1^3(q)|F1\text{-}r_1|+(1\text{-} M_1^3(q))|F1\text{-}r_3|)$, then $c_1^2= M_1^2(q)$ and *F2 accepts.*
- $M_1^3(q)|F1\text{-}r_1|+(1\text{-} M_1^3(q))|F1\text{-}r_3|< M_1^2(q)|F1\text{-}r_1|+(1\text{-} M_1^2(q))|F1\text{-}r_2|$ and
- $M_1^3(q)|F1\text{-}r_1|+(1\text{-} M_1^3(q))|F1\text{-}r_3|\leq |F1\text{-}q|$, then $c_1^3= M_1^3(q)$ and *F3 accepts.*
- $|F1\text{-}q|<min([M_1^2(q)|F1\text{-}r_1|]+[(1\text{-} M_1^2(q))|F1\text{-}r_2|], [M_1^3(q)|F1\text{-}r_1|]+[(1\text{-} M_1^3(q))|F1\text{-}r_3|])$, then $c_1^2=0$ and *F2 rejects.*

If $|F2 - r_2|<|F2\text{-}r_1|$ and $|F3 - r_3|<|F3\text{-}r_1|$ and $|F1\text{-}r_2|<|F1\text{-}r_1|$ and $|F1\text{-}r_2|\leq|F1\text{-}r_3|$, then $c_1^2=0$ and *F2 accepts.* And if $|F2 - r_2|<|F2\text{-}r_1|$ and $|F3 - r_3|<|F3\text{-}r_1|$ and $|F1\text{-}r_3|<min(|F1\text{-}r_1|, |F1\text{-}r_2|)$, then $c_1^3=0$ and *F3 accepts.*

<u>Case 3: If $min(|F3 - r_3|\text{-}|F3\text{-}r_2|, |F2 - r_3|\text{-}|F2\text{-}r_2|)\geq 0$, then $c_2^3=1$ and *F3* accepts.</u>

Since, $c_2^3=0$ and $c_2^3=1$ are mirror images with respect to acceptability constraints, we can characterize the dynamics of both using a single case.

A. If $|F2–r_2|\geq|F2\text{-}r_1|$ and $|F3–r_3|=|F3\text{-}r_1|=|F3\text{-}r_2|$, *F2* and *F3* will accept any offer.

So, if $|F2–r_2|\geq|F2\text{-}r_1|$ and $|F3–r_3|=|F3\text{-}r_1|=|F3\text{-}r_2|$ and $|F1\text{-}r_1|\leq min(|F1\text{-}r_2|, |F1\text{-}r_3|)$, then $c_1^2=1$ and *F2 accepts*. If $|F2 - r_2|>|F2\text{-}r_1|$, Lemma 5 renders $|F1\text{-}r_2|<|F1\text{-}r_1|$ impossible. If $|F2–r_2|=|F2\text{-}r_1|$ and $|F3–r_3|=|F3\text{-}r_1|=|F3\text{-}r_2|$ and $|F1\text{-}r_2|< min(|F1\text{-}r_1|, |F1\text{-}r_3|)$, then

$c_1^2=0$ and *F2 accepts*. And if $|F2–r_2|\geq|F2-r_1|$ and $|F3–r_3|=|F3-r_1|=|F3-r_2|$ and $|F1-r_3|< min(|F1-r_1|, |F1-r_2|)$, then $c_1^3=0$ and *F3 accepts*.

B. If $|F2 – r_2|<|F2-r_1|$ and either $|F3 – r_3|<|F3-r_1|$ or $|F3 – r_3|=|F3-r_1|>|F3-r_2|$, all offers >0 will be rejected (since the consequence of rejection is r_2). Therefore, $c_1^2=0$, *F2 rejects* and $L=r_2$.

C. If $|F2 – r_2|\geq|F2-r_1|$ and $|F3 – r_3|<|F3-r_1|$ or $|F3 – r_3|=|F3-r_1|>|F3-r_2|$, only *F2* will accept an offer.

So, if $|F2 – r_2|\geq|F2-r_1|$ and $|F3 – r_3|<|F3-r_1|$ or $|F3 – r_3|=|F3-r_1|>|F3-r_2|$ and $|F1-r_1| \leq |F1-r_2|$, then $c_1^2=1$ and *F2 accepts*. If $|F2 – r_2|=|F2-r_1|$ and $|F3 – r_3|<|F3-r_1|$ or $|F3 – r_3|=|F3-r_1|>|F3-r_2|$ and $|F1-r_2| < |F1-r_1|$, then $c_1^2=0$ and *F2 accepts.* And if $|F2 – r_2|>|F2-r_1|$, Lemma 5 renders $|F1-r_2|<|F1-r_1|$ impossible.

D. If $|F2 – r_2|<|F2-r_1|$ and $|F3 – r_3|=|F3-r_1|=|F3-r_2|$, only *F3* will accept a non-zero offer. F1 coalesces with F3 unless it strictly prefers r_2 to any other r.

So, if $|F2 – r_2|<|F2-r_1|$ and $|F3– r_3|=|F3-r_1|=|F3-r_2|$ and $|F1-r_1|\leq min(|F1-r_2|, |F1-r_3|)$, then $c_1^3=1$ and *F3 accepts*. If $|F2 – r_2|<|F2-r_1|$ and $|F3– r_3|=|F3-r_1|=|F3-r_2|$ and $|F1-r_2|<|F1-r_1|$ and $|F1-r_1|\leq|F1-r_3|$, then $c_1^2=0$. And if $|F2 – r_2|<|F2-r_1|$ and $|F3– r_3|=|F3-r_1|=|F3-r_2|$ and $|F1-r_3|< min(|F1-r_1|, |F1-r_2|)$, then $c_1^3=0$ and *F3 accepts.*

E. If $|F2–r_2| \geq |F2-r_1|$ and $|F3–r_3|>|F3-r_1|$, then *F2* will accept any offer. *F1* coalesces with *F2* unless it strictly prefers r_3 to any other r.

So if $|F2 – r_2| \geq |F2-r_1|$ and $|F3 – r_3|>|F3-r_1|$ *and* $|F1-r_1| \leq min(|F1-r_2|, |F1-r_3|)$, then $c_1^2=1$ *and F2 accepts.* If $|F3 – r_3|>|F3-r_1|$, Lemma 5 renders $|F1-r_3|<|F1-r_1|$ impossible. If $|F2 – r_2|>|F2-r_1|$, Lemma 5 renders $|F1-r_2|<|F1-r_1|$ impossible. If $|F2 – r_2|=|F2-r_1|$ and $|F3 – r_3|>|F3-r_1|$ and $|F1-r_2|<|F1-r_1|$ and $|F1-r_1|\leq|F1-r_3|$, then $c_1^2=0$ *and F2 accepts.*

F. If $|F2–r_2|<|F2-r_1|$ and $|F3–r_3|>|F3-r_1|$, then F2 will reject any non-zero offer.

So, if $|F2 – r_2|<|F2-r_1|$ and $|F3 – r_3|>|F3-r_1|$ and $|F1-r_1|\leq min(|F1-r_2|,|F1-r_3|)$, then $c_1^3=1$ *and F3 accepts.*

If $|F2 – r_2|<|F2-r_1|$ and $|F3 – r_3|>|F3-r_1|$ and $|F1-r_2|<|F1-r_1|$ and $|F1-r_2|\leq|F1-r_3|$, then $c_1^2=0$ *and F2 accepts.* And if $|F3 – r_3|>|F3-r_1|$, then Lemma 5 renders $|F1-r_1|>|F1-r_3|$ impossible.

Proof of Proposition 2. The equilibrium described above is unique. From the equilibrium, it follows that if all of the game's parameters remain constant at any set of initial values, there can be no change in the offers or the outcome. As the examples in the text indicate, there exist changes in the ideal point of the president or the Senate that are sufficient to change the reconciliation that at least one potential coalition would produce. Some of these changes are sufficient to change at least one House faction's preferences over the three reconciliations that can emerge and to change the offer that factions will make and accept in equilibrium. Therefore, changes in *s* or *p* can change the balance of power in the House.

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Table 1. Variable Definitions

F1, F2, F3 $\in\Re^2$	The ideal points of three House factions
F1, F2, F3	We also use these terms as shorthand to refer to individual factions in the text. In examples, we sometimes refer to *F1* and *F2* collectively as the majority party and to *F3* as the minority party.
%Fi	The percentage of the House that faction *i* controls, where $i\in\{1, 2, 3\}$
s	The Senate's ideal point, where $s\in\{F1, F2, F3\}$
p	The President's ideal point, where $p\in\{F1, F2, F3\}$
$\boldsymbol{r_i}$	The reconciliation between House faction *i* and the Senate, where $r_i\in\Re^2$
q	The status quo policy, where $q\in\Re^2$
L	The outcome of the game's legislative process, where $L\in\{r_i, q\}$
U_i(L)	The policy utility to players with ideal point *Fi* from legislative outcome *L*. Denoted as -|*Fi*-*L*| for simplicity. In reality, $U_i(L)=-\sqrt{(x_{Fi}-x_L)^2+(y_{Fi}+y_L)^2}$, where x_d denotes the position of $d\in\{Fi, L\}$ on the horizontal axis of the two-dimensional policy space and y_d denotes the position of $d\in\{Fi, L\}$ on the policy space's vertical axis.
$\boldsymbol{c_i^k\in[0, 1]}$	A power sharing offer from faction *i* to faction *k*, where $k\in\{1, 2, 3\}$.
CS	The constitutional set, where $\text{CS}\in\Re^2$
v>0	The amount, in policy utility, by which r_i must beat *q* for the Senate to support an override of the President's rejection of r_i.
$\boldsymbol{mid_i}$	The midpoint of the line connecting faction i's ideal point to that of the Senate.
$\boldsymbol{sec_i}$	The point in the CS closest to mid_i when $mid_i\notin CS$.
$\boldsymbol{\pi_x}$	A variable that breaks ties regarding player choices but does not affect outcomes. It represents player *x*'s public stance, where $x\in\{Senate, President, F1, F2, F3\}$. $\pi_x>0$ denotes player *x*'s desire to be seen supporting a particular outcome, even though their decision has no bearing on the outcome. $\pi_x>0$ denotes player *x*'s desire to be seen opposing the outcome, even though their decision has no bearing on the outcome. $\pi_x=0$ denotes player *x*'s indifference in that situation.

Table 2. Theoretical Predictions and Empirical Findings, Sin 2008.

Predictions of existent theories and CTLO

	PREDICTIONS	OUTCOMES
Change in Senate and /or President, No Change in House	Constitutional Theory predicts a greater number of Houses changing under these circumstances	**73% (20/28)**
No Change in Senate and President, No Change in House	Existent theories predict no differences between cells. Senate and President's preferences are presumed irrelevant.	**32% (5/23)**

Figure 1

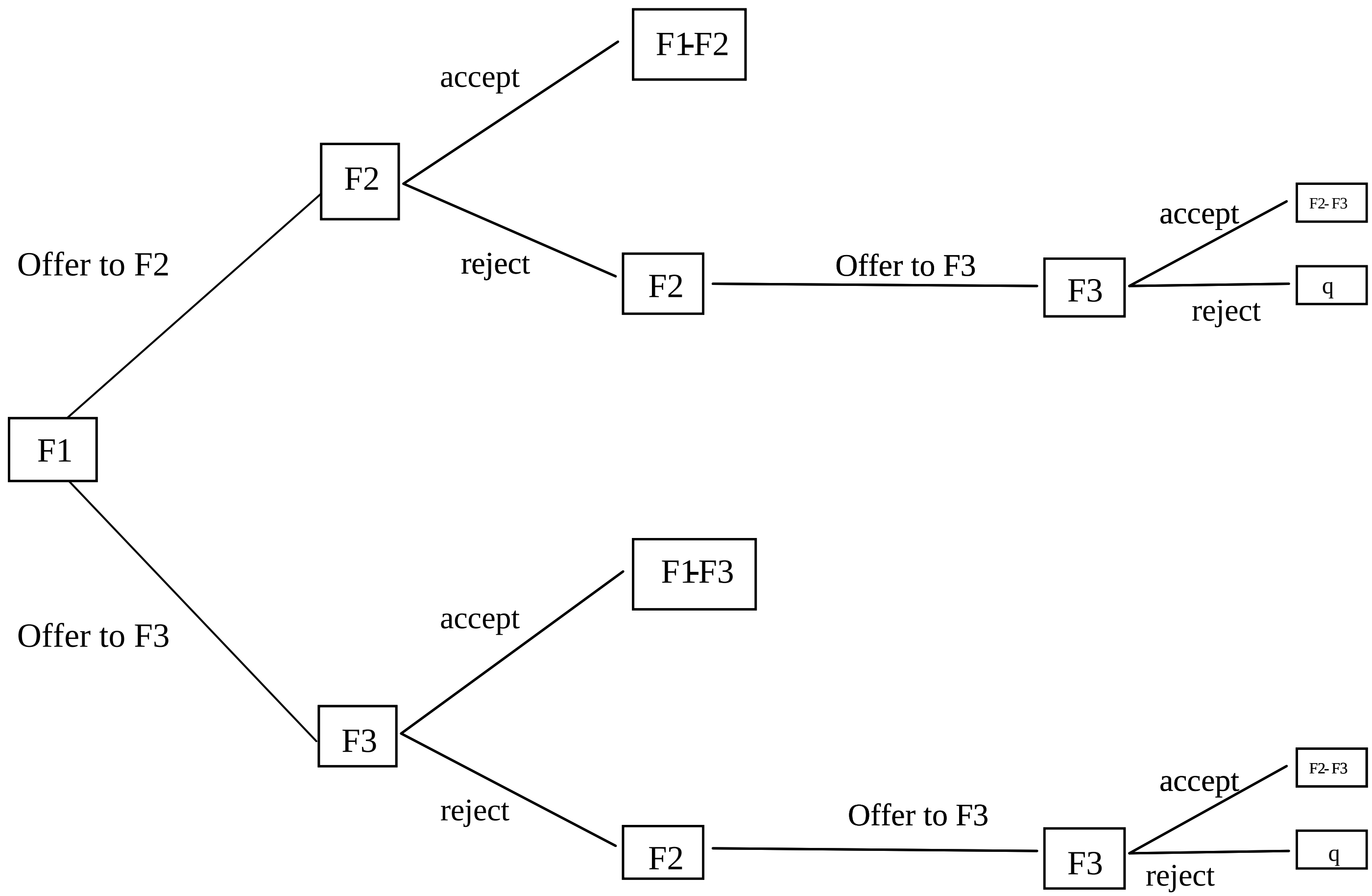

F1
Offer to F2
Offer to F3
F2
accept
reject
F1-F2
F2
Offer to F3
F3
accept
reject
F2-F3
q
F3
accept
reject
F1-F3
F2
Offer to F3
F3
accept
reject
F2-F3
q

Figure 2

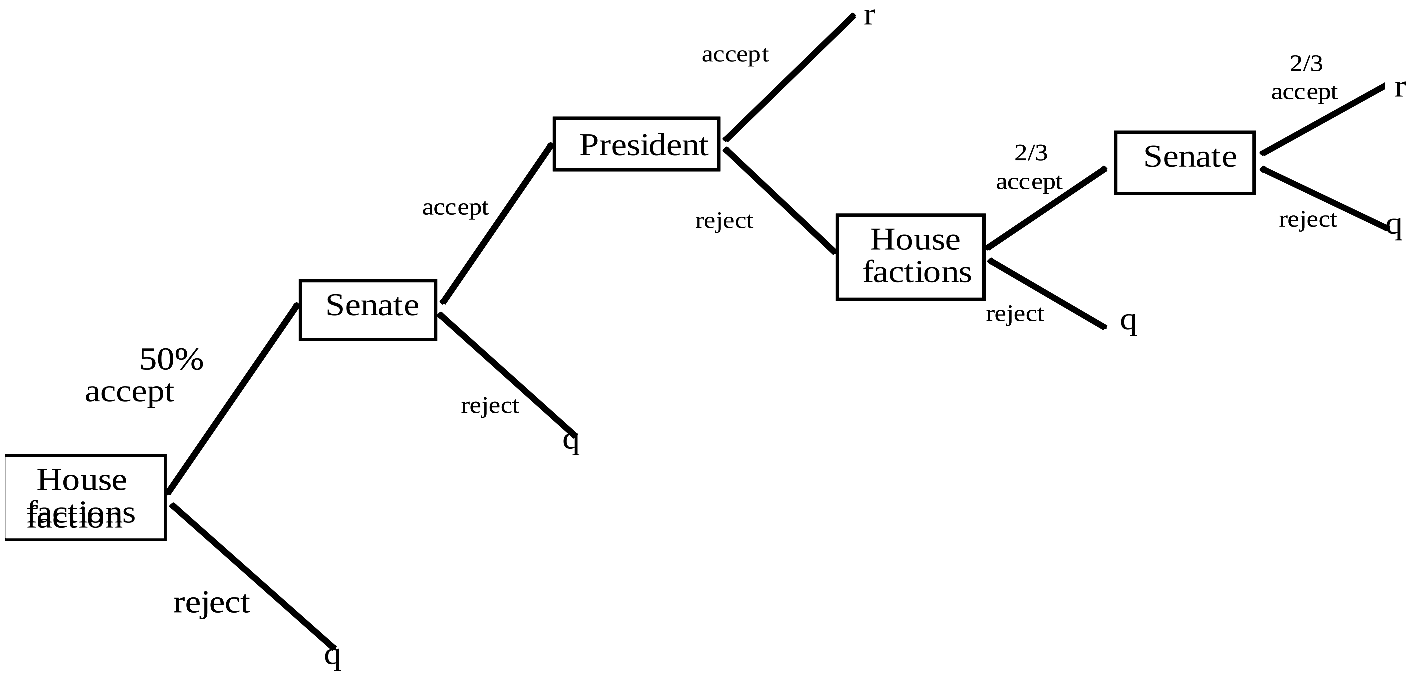

House factions
50% accept
reject
q
Senate
accept
reject
q
President
accept
r
reject
House factions
2/3 accept
reject
q
Senate
2/3 accept
r
reject
q

Figure 3

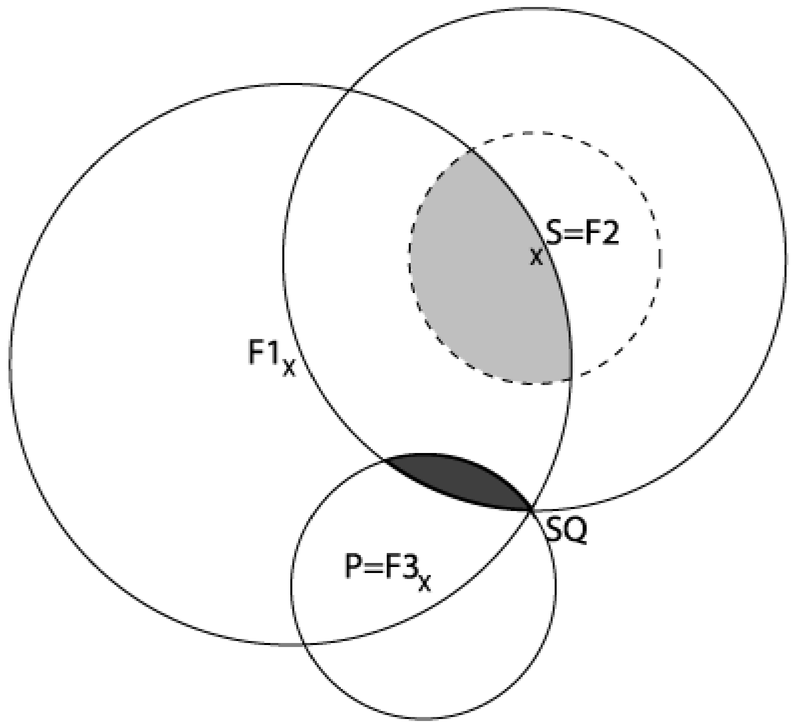
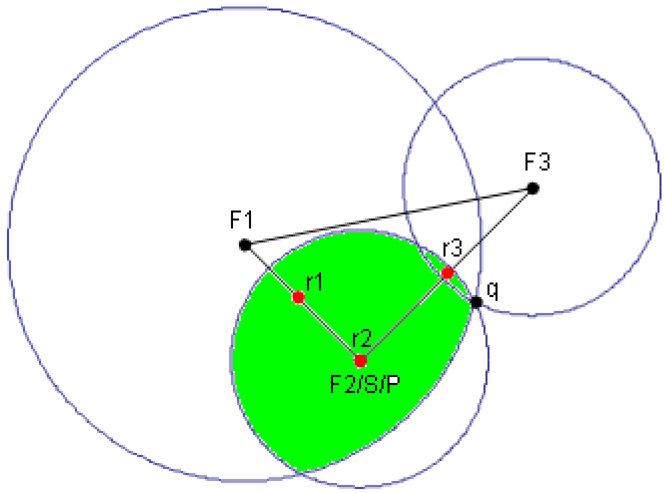


Figure 4

The Senate and President have the same ideal point as F2.



The Senate moves to faction F3's ideal point

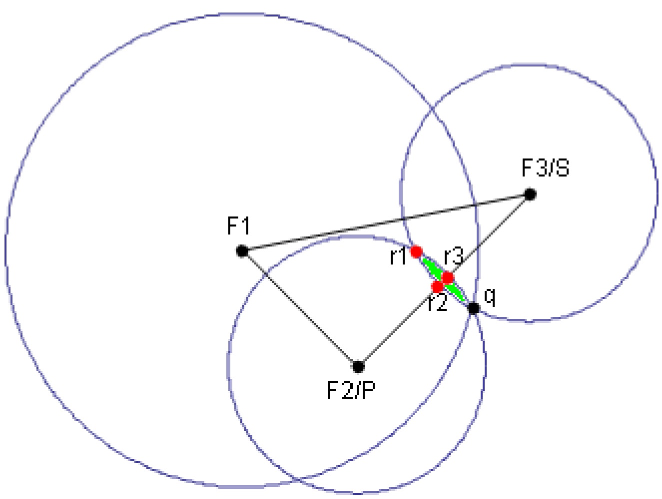
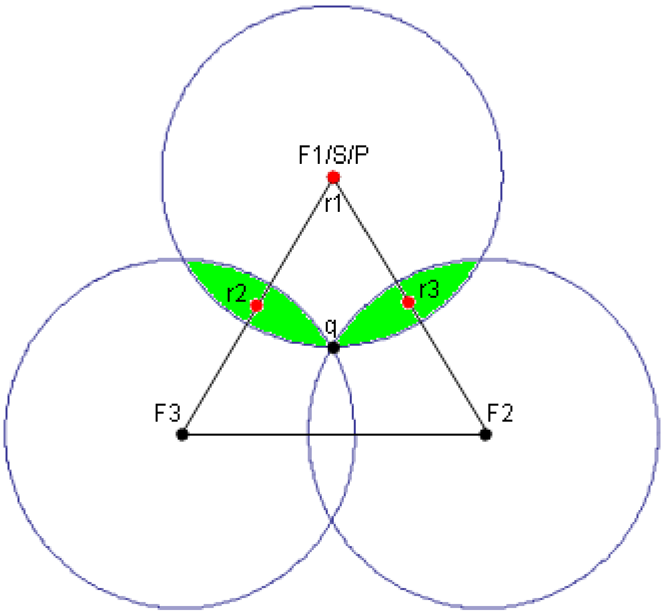


Figure 5

The Senate and President have the same ideal point as F1



The President moves to faction F3's ideal point

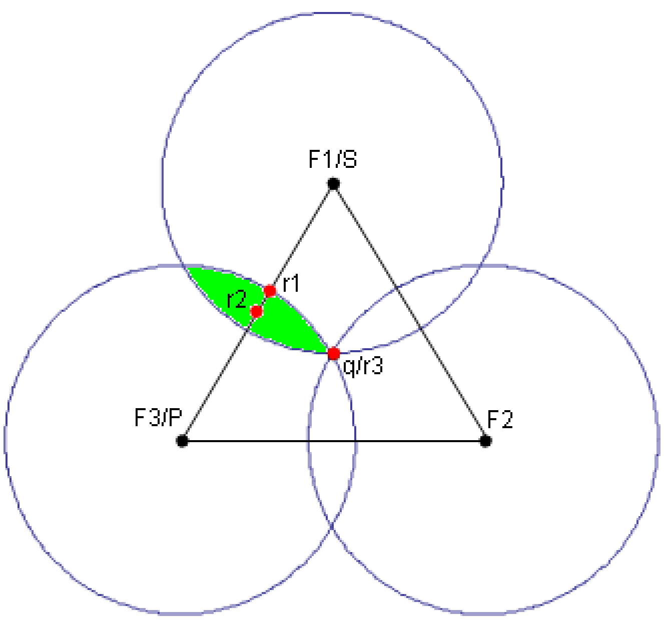


Figure 6.1

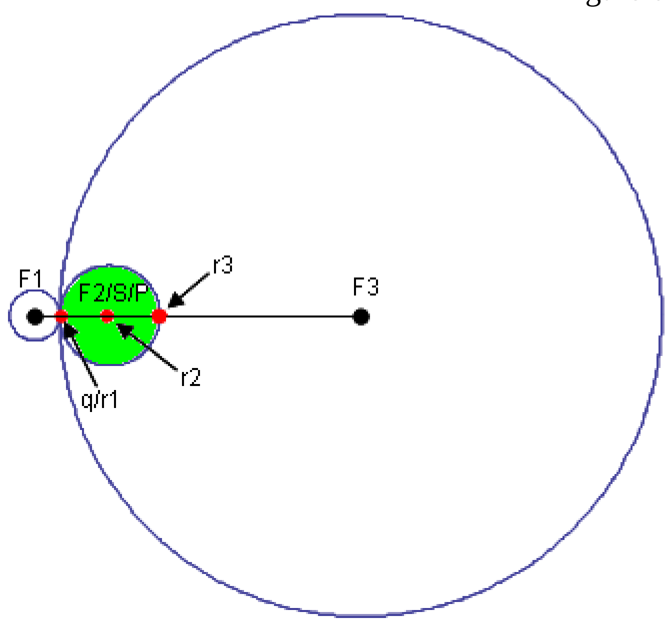


Figure 6.2

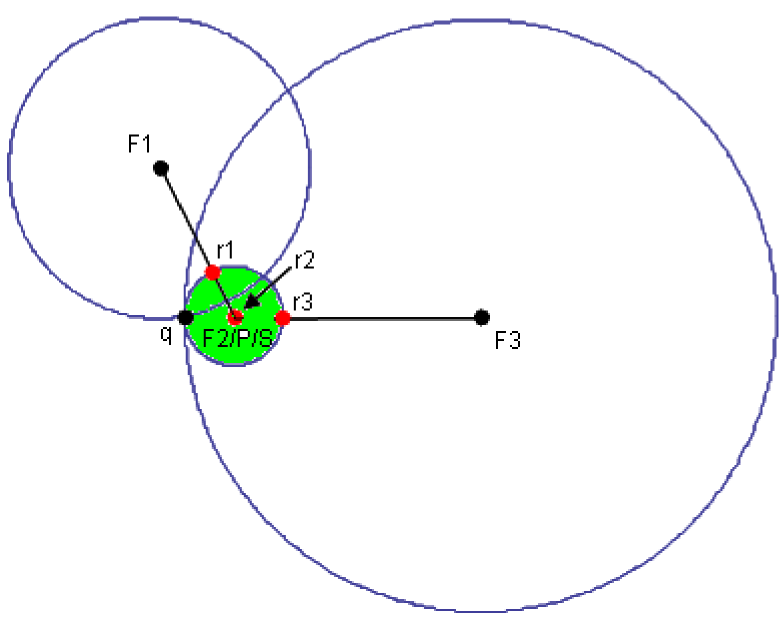


Figure 6.3