War of Words: The Filibuster as a War of Attrition

Douglas Dion
Frederick J. Boehmke
Department of Political Science
University of Iowa
Iowa City, IA

William MacMillan
Postdoctoral Research Associate
Department of Surgery
Washington University in St. Louis
St Louis, MO

Charles R. Shipan
Department of Political Science
University of Michigan
Ann Arbor, MI

May 25, 2015

We thank to Ravi Bhavnani for research assistance, Richard Beth, Pradeep Chhibber, Srihari Govindan, Ken Hendricks, John Huber, Greg Koger, Burdett Loomis, Barry Nalebuff, Walter Oleszek and Bob Pahre for helpful conversations and suggestions, and Sarah Binder and Eric Lawrence for sharing their data and expertise with us. Comments from participants at the 2008 EITM program at Duke, the 2009 St. Louis Area Methods Meeting, and the 2010 Essex Summer School in Social Science Data Analysis Instructor’s Lecture are also appreciated.
War of Words: The Filibuster as a War of Attrition

Abstract

Contrary to popular claims, we argue that the filibuster conveys meaningful information about participants’ willingness to fight for an issue. To this end, we present a model of the filibuster as a continuous-time, two-sided game of incomplete information and derive predictions about the frequency and hazards of observed filibusters. We show that informative signaling in the model can be detected by the presence of a specific mixture over distinct duration processes. Using a new estimator consistent with these predictions, we find that the filibuster has historically conveyed information, and that it continues to do so, counter to many claims. In addition, the model is also able to explain variation based on observables in the frequency of filibusters (including the puzzling increase in filibustering after changes in Senate rules that eased the adoption of cloture) as well as the duration of filibusters.
Introduction

Legislative procedures typically garner very little press. Quorum calls, the pairing of members, motions to recommit – all of these can play a significant role in the legislative process, but they are hardly the stuff that front-page headlines are made of. The exception, of course, is the filibuster in the Senate, which allows individual senators, or groups of senators, to derail bills and other legislative business, often without discussion and in opposition to the views of a majority within the chamber. As a result, modern-day characterizations of the U.S. Senate as the “world’s greatest deliberative body” are often ironic rather than boastful. The Senate is regularly criticized as a broken branch, one where serious policy deliberation is nowhere to be found and policies with majority support are routinely defeated. Criticisms along these lines can be found easily, but few are as scathing as an August 2010 essay by George Packer. Published in *The New Yorker*, Packer’s “The Empty Chamber” devotes over 11,000 words to chronicling an institution seemingly designed to insulate itself from informed policy-making.

To understand the role of the filibuster in the US Senate, one must therefore account for both its potential use as a tool of obstruction for the minority and its ability to reveal information about the strength of the convictions of opposing coalitions. By engaging in a filibuster, both sides indicate their initial willingness to incur potential costs (e.g., business foregone) or reap benefits (e.g., by drawing attention to a specific policy position for constituents). These signals may be made even stronger by continuing an ongoing filibuster and incurring further costs and benefits. Each side has something to gain if such signaling can persuade the other side to back down: proponents move closer to ultimately passing legislation while opponents hope to persuade supporters that their battle is futile and the legislation in question should be withdrawn.
Although political scientists have examined the obstructionist nature of the filibuster (e.g., Koger 2010), few scholars have examined the potential informational benefits. Most prominently, Wawro and Schickler (2006) argue that filibusters can be viewed as “wars of attrition” in which each side attempts to outlast the other in order to secure their desired outcome (see also Luce 1922 and Burdette 1940). We build here on their pioneering analysis – in particular on their identification of uncertainty as playing a key role in the decision about whether to support or oppose a filibuster – and use a modeling approach that explicitly incorporates uncertainty. Our model makes clear how the filibuster can play an informational role, one that provides each side in a legislative battle with information about their opponents’ resolve. Specifically, our model generates predictions about how the frequency and duration of filibusters change with characteristics of the two sides and the issues at stake. Our empirical evidence suggests that legislators do learn from delay and strategic interaction of majorities and minorities reveals important information to politics actors regarding, for example, the strength of legislative opponents, the value they place on winning, and the reward they earn from fighting the fight, regardless of the outcome.

Our analysis makes several notable contributions. First, we derive our findings by modeling the filibuster, following Kreps and Wilson (1982), as a two-sided game of incomplete information. As we discuss below, ours is the first analysis to explicitly model the filibuster as a war of attrition game. In addition to letting us assess the informational value of the filibuster, and whether this value has changed over time, this approach allows us to derive a number of new insights into features discussed earlier: frequency and duration. Regarding frequency, our analysis provides an explanation for increases in the use of the filibuster over the time period we
examine (1917-1993), showing that they are a predictable response to procedural changes that were designed to make filibusters more difficult to sustain.

A more innovative result involves filibuster duration. A difficulty involved in moving from incomplete information models to empirical tests is that, in general, the variables unknown to the players are unknown to the researcher as well. The main technical contribution of the paper involves constructing such a statistical model of filibuster durations consistent with the equilibrium. As we show, a key prediction of the model is that informational contests like the filibuster should exhibit a mixture of two distinct hazard rates that reflect the “sorting out” expected from the model: filibusters involving weak types exhibit an increasing, endogenously truncated hazard whereas those involving two strong players are flat and continue past this truncation point.1

2. Previous Literature

Given the importance and prominence of the filibuster in the U.S. Senate, as well as its notoriety in obstructing change in a number of significant policy areas, it is somewhat surprising that for much of its existence the filibuster escaped sustained scholarly attention. Over the past fifteen years, however, this situation has changed, with several studies providing numerous insights on a range of topics. We have learned, for example, that filibusters, whether threatened or carried out, have had a substantial influence on the policies produced by the Senate (Binder and Smith 1997). We have gained a much better appreciation of how the filibuster compares

1 We note that our analysis has two additional interesting implications. First, since senators learn about their opponents during a filibuster, this implies that filibusters may have value for legislators that previous scholarship has underappreciated. Second, this learning also implies why the filibuster persists. We do not make scientific claims about either of these two implications, but our work suggests that senators would prefer the filibuster to exist, because they can efficiently learn about legislative opposition through its use
with other means of obstruction, both in the Senate and in the House (Koger 2010), as well as why some senators are more likely to engage in filibustering than others (Bell 2011). We have discovered that support for cloture reform in the early decades of the 20th century was a function of ideological distance from the party median, but was not influenced by other factors, such as seniority or prior service in the House (Koger 2006). More broadly, studies have added to the debate over the effect of path dependency, with one study contending that inherited rules have limited the Senate’s ability to reform the filibuster (Binder and Smith 1997) and another arguing that because institutional rules can be changed, the threat of rule changes is credible (Wawro and Schickler 2006).

Although these insights have increased our understanding of policymaking in Congress, three key contributions that emerge from the recent spate of analyses of the filibuster are especially significant. First, studies have explicitly examined changes in the use of the filibuster over time. In particular, Binder, Lawrence, and Smith (2002) (hereafter BLS) provide the first systematic test of factors that other scholars (e.g., Sinclair 1989, Binder and Smith 1997) have posited to affect the frequency of the filibuster. They find little support for the effect of external demands (e.g., the size of government), but find that institutional arrangements (e.g., the existence of a tracking system, whether it is the last session of the Congress) and policy considerations, measured by party strength, have significant effects. A more recent analysis by Koger (2010) finds little evidence that characteristics of the majority party matter, but does provide support for some of the other variables and categories in the BLS analysis – for example,
that minority party cohesion affects the use of filibusters, as do various institutional considerations (e.g., days in session, the size of the chamber).  

Second, studies have used the concept of the “war of attrition” to provide insights about the filibuster. Works going back to Luce (1922) and Burdette (1940) have discussed the filibuster in terms of one group seeking to outlast the other, but what is new is the extent to which recent scholars have developed this approach. Most prominent here is Wawro and Schickler’s (2006) use of the war of attrition framework to develop a theoretical account of the filibuster in the 19th and early 20th centuries. Although their explanatory concerns are broad-ranging, at the heart of their analysis is the notion that filibusters in the pre-cloture era can usefully be viewed as wars of attrition, where the outcome of an attempted filibuster is determined largely by which side – supporters or opponents of a bill – is more willing to endure the costs associated with a filibuster for a longer time. If all actors had complete information, of course, this outcome could be predicted, and as a result we would never see any filibusters. But in reality each group is uncertain about the preferences of the other, and so each will have an incentive to signal its willingness to outlast the other side.  

Finally, two recent studies – Bawn and Koger (2008) and Koger (2010) – have shown how formal approaches can be used to explore previously neglected aspects of filibusters as well as to generate testable predictions. Like Wawro and Schickler’s analysis, these studies provide a deeper theoretical foundation (and also like Wawro and Schickler, Koger explicitly adopts the

2 More generally, the studies by BLS and Koger (2010) yield different results in part because of two significant differences between these studies. First, their explanatory concerns differ. Binder, Lawrence, and Smith focus more on testing general hypotheses about the use of the filibuster; Koger is more specifically interested in testing hypotheses that emerge from a model that emphasizes the role of position taking and opportunity costs. Second, and more importantly, their dependent variables differ. Koger uses a more general measure of obstruction, one that uses a variety of measures of obstruction and that allows him to test for obstruction in both the Senate and the House. BLS rely on counts of filibusters, as compiled by Beth (1994). See also Bell 2011.

3 As noted earlier, we differ in contending that a war of attrition perspective can be applied even in the modern era.
view of filibusters as wars of attrition, at least in earlier eras). But by relying on formal analyses, these studies explicitly isolate and analyze two aspects of the filibuster that, while not ignored, were not central to earlier analyses. First, they incorporate position-taking, where engaging in a filibuster can be beneficial to members even when it does not succeed. Second, they recognize that a filibuster is costly, both politically and in terms of policy, and incorporate these costs into their model. The result is a theoretical approach that provides specific predictions about the conditions under which members are likely to engage in obstruction.4

Clearly, political scientists have taken tremendous strides toward providing a better understanding of the filibuster. At the same time, gaps remain. First, the studies that have conducted empirical analyses of filibustering over time – BLS (2002) and Koger (2010) – have focused their attention specifically on one aspect of change over time: the frequency of use. Yet as we have discussed, both frequency and duration are crucial components of the filibuster. Our approach provides an integrated and testable explanation of filibusters, one that makes predictions about both the frequency of use and the duration of filibusters.

Second, the study that most explicitly develops the idea of a war of attrition (Wawro and Schickler 2006) does so informally. We build on their work by explicitly modeling the role of uncertainty in order to generate specific predictions about the conditions under which minorities are likely to filibuster and majorities are likely to respond. More specifically, our incomplete-information model allow us to examine how information is revealed in the process of filibustering, and thus helps explain changes over time in the frequency and duration of filibustering.

4 Again, other studies have also considered and addressed these factors. But these two studies differ from earlier studies in terms of placing both costs and effort at the center of their analyses and in formally modeling these aspects of legislative behavior.
Finally, the formal models that exist do an excellent job of isolating the effects of effort and of demonstrating the ways in which formal analyses can inform our understanding of specific cases (Bawn and Koger 2008) and of general patterns over time (Koger 2010). At the same time, these previous studies cannot account for the learning that takes place during a filibuster battle. They are thus unable to shed light on the informational elements of filibustering that have attracted criticism from observers of the Senate – namely, that the filibuster has become trivialized (e.g., Will 1982).

The filibuster is a complex and highly strategic game. Our approach – modeling the filibuster as a game of incomplete information, one in which each side gains information over time about the resolve of their opponents – builds on both earlier studies that view filibusters as wars of attrition and those that model the importance of effort. In doing so, it allow us to determine the patterns that would emerge from viewing filibusters as a method for revealing information about the level of opponents’ resolve; it provides us with a unified explanation of when filibusters are likely to occur and how long they are likely to last; and it allows us to determine whether the pattern of filibustering in the U.S. Senate comports with the predictions of our informational model. We turn now to the development of the model.

3. The War of Attrition Game

Since much of the literature interprets filibustering in terms of a war of attrition, we build on the well-known formulation of the two-sided incomplete information war of attrition presented in Kreps and Wilson (1982), with a handful of minor modifications for presentational purposes. Given our interest in the empirical application of the model, we derive a number of additional results from the model that are far from immediate. For expository purposes we focus
in the text on the general features and predictions of the model; readers interested in verifying that the behavior set out below constitutes a sequential equilibrium are encouraged to turn to the technical appendix.

The game has two distinct stages. In the *Pre-Filibuster* stage, the two players (a Majority, *M*, and an Opposition, *O*) independently decide whether to issue a challenge over some issue. If neither issues a challenge, the game ends with the status quo in place and both players receiving 0. If the Majority alone indicates its willingness to fight, then it wins the issue outright, receiving a payoff of $\alpha > 0$ while the Opposition receives 0. Conversely, if *O* alone issues a challenge, it is *M* that loses out and receives 0, while *O* receives $\beta > 0$.

These outcomes recognize that it takes two to filibuster – one side to decide on obstruction rather than acquiescence, and another to fight rather than back down. Only if both sides choose to fight for their preferred outcome does the game move to the second (*Filibuster*) stage. We model this stage as a continuous-time war of attrition game with the players deciding simultaneously at each moment whether to concede or to continue fighting. Unlike some war of attrition models in IR (e.g., Fearon 1994), time in our model is bounded, reflecting the presence of a deadline in legislative politics – the end of the session – typically absent in crisis bargaining situations. We normalize time to run from 0, the start of the filibuster, to 1, the end of the session. The game ends either when a player concedes or time expires ($t = 1$).

Outcomes depend on how long the two parties fight. Suppose, for example, that *O* is the first to concede, either by abandoning its filibuster or by losing a cloture vote, say at point $\hat{t} \in [0,1]$. In this case, *M* wins and receives a time-discounted payoff of $\alpha (1 - \hat{t})$, while *O*
receives 0. If, by contrast, \( M \) was the first to concede, \( M \) receives 0 and \( O \) receives \( \beta (1 - \hat{t}) \).\(^5\)

Filibusters that are resolved quickly therefore deliver more benefits to the winning party, *ceteris paribus*.

Payoffs are determined not just by winning or losing the issue, but also by the players’ attitudes toward fighting.\(^6\) We assume that there are two possible types for each player and that each player knows its own type but is uncertain about its opponent’s type. In particular, we assume common knowledge of prior probabilities, denoted \( \gamma \) and \( \delta \), that the Majority and the Opposition, respectively, are strong, with \( 0 < \gamma < 1 \) and \( 0 < \delta < 1 \). Weak players suffer from fighting; strong players benefit (compare Mayhew 2003, 34). If fighting has lasted until time \( \hat{t} \in [0,1] \), then \( \hat{t} \) is subtracted from the player’s final payoff if the player is weak, and added if the player is strong.

By formally introducing incomplete information, we can evaluate existing arguments about the filibuster in a way that previous studies cannot. If the filibuster is uninformative, then play should leave these beliefs unchanged. By contrast, if the filibuster is informative, beliefs will change as players learn. To indicate changes in belief over time, we let \( p_t \) denote the probability at time \( t \) that \( M \) is Strong, while \( q_t \) represents the probability that \( O \) is Strong.

Although there is a lot of structure to the game, there are really only four important exogenous variables to keep track of:

- \( \alpha \), the value of the issue to the Majority;
- \( \beta \), the value of the issue to the Opposition;

---

\(^5\) As is standard in the literature, we assume that simultaneous concession yields 0 to both parties.

\(^6\) We thus follow Bawn and Koger (2008), in that senators gain utility from outcomes and also potentially from “fighting a good fight,” but work foregone does not enter the model.
• $\gamma$, the prior probability that the Majority is the type of player who gains from fighting (i.e., the player’s belief that $M$ is strong);
• $\delta$, the probability that the Opposition is the type of player that gains from fighting (i.e., the player’s belief that $O$ is strong).  

**Equilibrium**

We concentrate here on the sequential equilibrium characterized in Kreps and Wilson (1982). The formal proof is presented in the technical appendix – in this paper, we focus on the intuition behind the result.

The strategy for strong players is simple: they always enter, and they always continue fighting. Even if the other side is sure to fight, a strong type can only gain by refusing to concede until the end of the period. This simplifies the analysis tremendously by enabling us to concentrate on the strategic choices of the weak types.

The key to understanding these strategic choices lies in the role of indifference. In equilibrium, weak players are (i) indifferent in the Pre-Filibuster stage between issuing a filibuster challenge and acquiescing, and (ii) indifferent in the Filibuster stage between conceding at time $t$ and continuing to fight for some small additional period $\varepsilon > 0$. The need to maintain this indifference in turn explains the behavior of the weak players in the two stages of the game. First, weak players self-select into filibuster challenges in order to make the weak players on the other side indifferent between issuing a challenge and not issuing a challenge. The conditions required to generate this indifference (and thus satisfy condition (i)) yield comparative statics regarding the frequency of filibusters.

---

7 The symbols follow (Greek) alphabetical order, with $M$ first and $O$ second.
Turning to the Filibuster stage, for a weak player to be indifferent at each point between conceding and fighting, there must be some chance that the other side will concede. If the other player will never give up, then delaying concession only hurts the weak player’s payoffs. Since strong players never concede, potential concessions must come from the weak type of opponent. As the chance that a weak type would drop out increases, however, the belief that one is facing a strong player increases, providing weak players with a greater incentive to back down. The only way that they will continue, then, is if the chance that their opponent, if weak, drops out increases as well. At a certain point (that we calculate), a weak player will have conceded with probability one. Thus any filibuster that lasts beyond this point must involve two strong players. This endogenous end point combined with the distinct hazards of these two types of contests allows us to generate a strong prediction about the empirical shape of the hazards produced by a war of attrition battle such as the filibuster.

4. Predictions Regarding Functional Forms and Comparative Statics

The Kreps and Wilson model is invaluable for determining how parties to a war of attrition will behave in the presence of incomplete information. Unfortunately, the key to the game-theoretic analysis – the identification of equilibrium strategies based on player type – is problematic when it comes to empirical work. The incomplete information facing the players in the game, which leaves them unable to determine who is strong and who is weak, creates problems for the empirical analyst as well. If players in the game do not know the type they are facing, how can we as outsiders hope to know?

One solution is to take advantage of the probabilistic model underlying the formation of (unobservable) prior beliefs about type, and use that to explicitly derive a statistical model of
(observable) filibustering behavior. This constitutes the main technical contribution of this paper, and provides an example of one way to strengthen the link between formal theory and empirical tests (Morton 1999; Signorino 1999; Granato, Lo, and Wong 2010). We separate the analysis into two parts: filibuster frequency and filibuster duration.

**Number of Filibusters**

A filibuster occurs in our model only if both actors decide at time $t=0$ to fight. Since strong players always choose to do so, the probability of a filibuster depends on the choices of the weak types in the Pre-Filibuster stage. Ascertain how often a weak player will decide to issue a challenge can be determined using the indifference condition discussed above. At each moment in time, weak players must be indifferent between conceding and continuing to fight. For this condition to hold, players’ beliefs about the probability of a strong opponent must satisfy a precise balancing condition $q_t = (p_t)^{\beta/\alpha}$ for each $t$ in which weak players are still in the game.\(^8\) In particular, this condition must be satisfied at the onset of the Filibuster stage (i.e., when $t = 0$). If this condition is not met then weak players will either prefer to concede or continue fighting with certainty and the equilibrium would break down. Striking just the right balance allows weak players to stay indifferent and therefore to continue playing a mixed strategy.

The need to satisfy this balancing condition enables us to derive the probability that weak players will issue challenges, and thus the probability that a filibuster will commence. If weak players enter with certainty, beliefs will remain unchanged, and thus $p_0 = \gamma$ and $q_0 = \delta$. Since it

---

\(^8\) This condition is derived in the technical appendix. As discussed above, by a certain point in the game, all weak players will have dropped out. Note that if no weak players remain, then $p_t = q_t = 1$. 

14
is unlikely that prior beliefs will satisfy the knife-edge condition that $\delta = \frac{\beta}{\alpha}$, the balancing condition will be met only if at least one side foregoes the opportunity of issuing a challenge.

Hypothetically, the initial balancing condition could be met in an infinite number of ways. The strategic nature of the game, however, imposes an important constraint. Since strong players always enter, it is never possible to reduce the prior probability of facing a strong player. The balancing condition only can be achieved, then, by increasing the probability of facing a strong player. There are thus only two possible cases to consider: Case 1, where the prior probability of a strong Majority ($\gamma$) is too low ($\delta \geq \frac{\beta}{\alpha}$); and Case 2, where the prior probability of a strong Opposition ($\delta$) is too low ($\delta < \frac{\beta}{\alpha}$). Weak players from the side with a paucity of strong types must therefore choose to issue a filibuster challenge at a lower rate than those on the other side in order to bring beliefs into line.\(^9\) These two cases and the balancing condition are illustrated in Figure 1, which shows for an initial mixture of types the set of updated beliefs that would satisfy the balancing condition (the bold curved line) and the direction of feasible updated values that can be achieved by weak players failing to enter the filibuster stage.

[Figure 1 Here]

Although there are an infinite number of entry rates leading to the appropriate mix of types satisfying the balancing condition, we focus on the one examined by Kreps and Wilson. In this equilibrium, we assume that weak types of one side always enter while weak types of the other side enter at a rate that produces the correct initial mix of types at the beginning of a

\(^9\) If, for example, there are too few strong Majority players and not enough weak Majority players sit out the filibuster, then the Opposition weak types will not play a mixed strategy during the filibuster since their chance of winning has increased. This in turn will cause the weak Majority players who enter to have no chance of winning; and they will therefore quit immediately or choose not to filibuster at all.
filibuster. This assumption produces the largest equilibrium probabilities that players enter a filibuster, and hence the greatest chance of a filibuster.

To calculate the probability of a filibuster, we must combine this information about the probability that each type of player issues a challenge with the initial probability distribution over types. Table 1 summarizes this information for the case where the probability of a strong Majority player is too low. Considering all four possible combinations of players and types leads to the following probability of a filibuster for Case 1:

$$\Pr\left[\text{Filibuster} \left| \delta \geq \gamma^a\right. \right] = \frac{\gamma}{\delta^b}$$

(0)

Case 2, in which the initial probability of a strong Opposition player is too low, yields the following probability of a filibuster:

$$\Pr\left[\text{Filibuster} \left| \delta \leq \gamma^a\right. \right] = \frac{\delta}{\gamma^a}$$

(0)

Both results are derived in the technical appendix.

[Table 1 Here]

Which specific case is most relevant in any analysis is, of course, an empirical issue. There are, however, some dynamics that should characterize the empirical results regardless of which case obtains. For one, it will almost certainly be the case that some issues will escape filibustering (that is, the probability of a filibuster, all else equal, will almost certainly be less than 1).\(^{10}\) Second, the measures of prior beliefs and issue salience for each particular party should always have the same sign. Third, the direction of the effect of each variable for the majority should always be opposite to that of the opposition.

\(^{10}\) The only exception occurs when the balancing condition is met at the outset.
Our interest in the modern Senate, however, pushes us in a particular direction. Claims that the modern Senate offers ample incentive and opportunity for the individual obstructionist in our view strongly suggests that the prior probability of a strong Opposition is higher than that of a strong Majority, and that the value of the issues under contention are more important to the Opposition than to the Majority. Given these conditions (in technical terms, that $1 > \delta \geq \gamma > 0$ and $\beta \geq \alpha$), it follows that $\delta \geq \gamma^{\alpha}$, the condition required for Case 1. While such an inference requires more careful empirical scrutiny, it does suggest the following very specific predictions: filibustering should become more frequent as the Majority gains in strength or increasingly values the contested issue, and less frequent when such changes occur on the Opposition side.

If supported, this analysis provides a new explanation for the puzzling increase in filibustering following the 1975 reduction of the voting requirement for cloture. Previous explanations have suggested either that the effect of the 1975 reform was swamped by simultaneous changes in the electoral landscape that increased the benefit of filibustering (e.g., Binder and Smith 1996), or that scholars have overstated the influence of procedures on legislative behavior (Uslaner 1993). Our theory, by contrast, suggests that this increase constitutes heretofore overlooked evidence of the effect and significance of the procedural change: an increase in majority strength leads, in an environment that overall favors the opposition, to an increase rather than a decrease in filibustering.

The Hazard of Filibusters

---

11 These assumptions characterize general behavior regarding minority obstruction in the Senate; both draw from the benefits that the Opposition can earn from position taking and returns from observable effort spent fighting legislation (Bawn and Koger 2008). See also Smith (1989), Sinclair (1989).
Since the filibuster is modeled as a continuous-time war of attrition, player strategies are characterized by individual hazard rates. If we were able to identify which players were strong and which players were weak, the empirical estimation of the theoretical model would be straightforward. Unfortunately, like the players in the game, we lack this information. If a filibuster ends fairly rapidly, for example, we can infer only that at least one of the players was a weak type. Whether it was the majority, the opposition, or even both that were weak cannot be known.

This sort of problem is common to those who study the empirical implications of incomplete information models. In general, the problem has been avoided, typically by concentrating on particular substantive implications and tacking on a random error (though see Signorino (1999) or Lewis and Schultz (2003) for exceptions).

Our approach is different. We use the parameters of the model along with the characterization of player strategies to formally derive the expected distribution of filibuster durations across the different combinations of player types. While it would be straightforward to combine all four potential interactions into a single hazard, we instead distinguish the hazard for filibusters with two strong players from the expected hazard that results from all other player combinations. We do so because filibusters involving two strong players have a qualitatively different form that we can distinguish in our empirical tests. Since strong players never exit, the hazard when they face each other is flat and zero, whereas those filibusters involving at least one weak player all have an increasing hazard, as does their average.

This two-part hazard function does not fully characterize the course of filibusters over the entire length of a session – filibusters involving at least one weak player are defined only up until an endogenous horizon, $t^*$, after which all remaining filibusters must involve two strong players.
and therefore continue until the end of the session. Although we cannot know players’ types for a given filibuster in our empirical tests, partitioning them in this way will prove helpful for developing an estimator that accounts for the predicted mixture of two distinct hazards.

Our first prediction for observed filibuster durations is therefore unusual, but also unusually precise. Our informational model of filibustering predicts that the pattern of observed filibusters will consist of a mixture of two distinct hazards: one that is flat and zero and a second that increases over time as weak types exit. The latter will end at some point $t^*$ whereas the former will continue. Our second prediction considers how changes in the parameters affect these two components of the hazard. Since strong types never leave, the hazard rate for strong-strong filibusters does not depend on any parameters in the model. This is not the case for filibusters involving at least one weak player, which do vary in two ways. First, the hazard rate is lower for issues of greater value to either side. This makes sense since weak players will be willing to fight longer and bear greater costs for something of greater value. Second, the rate at which filibusters end depends on the prior probabilities that either side is strong. In Case 1, on which we focus, the hazard for filibusters with a weak player increases with $\delta$, the probability of a Strong Opposition, and does not depend on $\gamma$, the probability that the Majority is strong. In general, then, we predict a positive relationship for one measure of prior beliefs and no relationship for the other. Third, the proportion of filibusters involving two strong players increases with $\delta$ in Case – again, a positive effect for one variable and no effect for the other is predicted. Fourth, the endogenous time horizon, $t^*$, for filibusters involving at least one weak

---

12 This raises an empirical question: is it true that the filibusters in our dataset continue until the end of the session? The answer is no. Our view is that once the horizon has been reached, both players know that they cannot win. Mutually advantageous bargaining to end the filibuster can arise at that point without fear of attracting weak types.
player, decreases with $\delta$ and increases with $\alpha$. Table 2 summarizes these predictions for Case 1 while Table 1 in our theoretical appendix presents the corresponding predictions for Case 2.

[Table 2 Here]

To illustrate these relationships, Figure 2 offers hypothetical examples of the predicted hazard rates for filibusters involving two strong players and those involving at least one weak player. We hold the values of the issue to the Majority constant at $\alpha = 1$ and vary $\beta$, the value of the issue to the Opposition; we also set the initial probability of a strong Opposition player at 0.25 and 0.75 to show how this affects the length of the sorting period from time zero to $t^*$. Together, these values put us in Case 1. As noted, when $\beta$ increases the hazard decreases and as the initial probability of a strong Opposition player increases the length of the sorting period decreases.

[Figure 2 Here]

5. Data and Estimation

Assessing how well the theory presented here captures the actual dynamics of filibustering requires data and an estimation procedure. For reasons discussed below, we rely on existing data. Current estimation techniques, however, are inadequate. We therefore present a new estimator consistent with the model’s predictions, one that enables us to get a handle on the problems associated with the statistical analysis of fixed-horizon incomplete information games. Although closely tied to the model, the estimator is of general interest to similar war of attrition-type situations outside the field of legislative politics.

Data and Measures
A noteworthy aspect of the theoretical model presented here is that it provides an integrated explanation for both the number of filibusters as well as their duration. Decisions about data and measures have been driven by our wish to maintain this valuable property. This required, first, a data source providing counts as well as duration information on filibusters, and, second, that we use the same measures for the variables in both the count models and the duration models.

With respect to the first point, there is only one existing source that provides data on both dependent variables: Beth’s (1994) canvassing of filibustering from 1789 until 1993. Given our interest in cloture, we look only at the period after the adoption of the cloture rule in 1917. As a robustness check, we ran all our statistical models against both the original Beth dataset and the BLS updated count of filibusters per year.

Moving to our independent variables, we measured $\gamma$ and $\delta$ (the prior belief parameters) through changes in the rule governing the filibuster over time. The baseline is set by the 1917-1948 and 1959-1974 eras, during both of which filibusters were ended with a supermajority of

---

13 More specifically, we use the number of filibusters per year and the duration (in terms of days) of these filibusters as our two dependent variables. We have corrected three small errors in Beth’s original dataset regarding the Congress of record. All results in this paper are based on this corrected data rather than the original dataset.


15 BLS use Binder and Smith’s (1996) dataset, which starts with Beth’s list of filibusters and then supplements and corrects it using Burdette’s (1940) historical analysis and recent volumes of the Congressional Quarterly Almanac. Koger (2010) critiques Beth’s approach and uses an alternate approach, relying on news coverage of Congress in Time, the New York Times, and other sources (e.g., various volumes of Congressional Quarterly). While Koger’s data collection efforts are truly impressive and appropriate for his analysis, they have three drawbacks for our purposes. First, he does not measure the duration of filibusters. Second, as he acknowledges, although drawing on a variety of sources has its benefits, it also has its costs – namely, he needs to use different combinations of sources at different points in time. Third, he is interested in obstruction more generally, and thus includes instances in which representatives or senators delayed action on a bill using tactics that many observers would not classify as “filibusters.” Although the two series are highly correlated, each coding approach has potential problems, with Koger’s at risk of Type I errors and Beth’s Type II. Most importantly from our standpoint, recently Bell (2011) has meticulously gone through congressional records to determine when filibusters occurred. Her list of filibusters is extremely similar to Beth’s ($r=0.93$), despite using a different and more thorough methodology, which gives us much greater confidence in using Beth’s list. Because Beth’s dataset contains data on the length of each filibuster, which is central to our argument and analysis, we continue to use his list rather than Bell’s. We note, however, that if we use Bell’s list for our analysis of frequency, our results are substantially the same.
two-thirds of those present and voting. We then constructed three variables corresponding to deviations from this baseline. First, we have an indicator variable corresponding to the period 1949-58, during which a two-thirds requirement for cloture (i.e., two-thirds of those serving in the Senate, rather than two-thirds those present and voting) was in effect. By increasing the threshold for cloture, this change should strengthen the Opposition and therefore should correspond to a larger value of $\delta$. Second, we have an indicator variable for the period 1975-84, during which the 60-vote cloture requirement was the rule. By reducing the hurdle for cloture, this change should strengthen the position of the Majority, and thus corresponds to larger values of $\gamma$. The same would be true of our third indicator variable, the 1986-1996 period, in which reformed post-cloture procedures reduced the number of hours of debate after a successful cloture vote. These variables are included in both the count models and the duration models.

To test the influence of issue importance ($\alpha$ and $\beta$), we compared the subject of each filibuster in our dataset to Binder’s (2003) list of salient issues for each Congress. Where the two clearly matched, we identified the issue as being important to both the Majority as well as the Opposition. Similarly, where there was no overlap, we coded the issue as unimportant to both sides. Because some issues were difficult to classify as either important or unimportant, we categorized these as “unclear” (i.e., a middle category between important and unimportant). In the end, we identify 147 (54%) issues with high relative importance for the Majority and 35 (13%) with a low relative importance, leaving 92 (34%) in the unclear importance category. Since the model makes the same prediction about $\alpha$ and $\beta$, policy importance to the Majority and Opposition, on the hazard rate, we cannot assess the independent effects of policy importance, but we can test whether these variables matter overall.

---

16 We will share our data so that others can see precisely how individual filibusters were coded.
These measures are useful when analyzing the duration of individual filibusters, but we cannot use them to study the number of filibusters per year since they are tied to specific issues on which filibusters occurred. For the frequency of filibusters, we need a measure of issue importance for potential filibusters over an entire session. A typical measure of the degree to which a party is unified in terms of policy agenda is the Rice cohesion index.\textsuperscript{17} To capture the dynamic, we look at the ratio of the majority party’s Rice cohesion index to the same score for the opposition party. This measure, corresponding to $\alpha/\beta$, has been used previously in the literature (Binder 1997).\textsuperscript{18} Since this ratio of policy importance appears directly in our prediction (Equations 1 and 2) we can interpret its effect on the number of filibusters. Table 2 presents a review of these measures. While not listed in Table 2, we have also included other variables as controls that have been found to have significant effects on filibuster activity in previous studies (e.g., Binder, Lawrence, and Smith 2002).

Evaluation of the Hazard Rate: A New Estimator

The primary empirical prediction of the incomplete information model is the distinct mixture between two hazard rates: the hazard of filibusters involving at least one weak player should increase over time until all weak types have exited (i.e., until $t^*$) while those involving two strong players should be flat and zero until the end of the time period. Again, no other model of the filibuster predicts anything about the hazard rate, much less this particular relationship.

Because of the two distinct components, we cannot assess our prediction by simply estimating a parametric duration model such as the Weibull. This approach would completely

\textsuperscript{17} The Rice cohesion measure takes the absolute value of the difference between the number of Yes votes cast by a party and the number of No votes, and divides that absolute value by the total number of Yes and No votes cast. See Rice (1924) for the original discussion and Desposato (2005) for a discussion of statistical properties.

\textsuperscript{18} We thank Sarah Binder for providing the underlying data from which these measures were created.
miss the two critical consequences of informational filibustering, namely, the presence of two distinct hazards and the endogenous truncation of filibusters involving at least one weak player. Rather, we take an approach that corresponds more closely to our theoretical model by developing an estimator that captures these two features of our predicted hazards.

First, we do not know players’ types in the real world, so we develop a model based on the assumption that there are two qualitatively different types of filibusters mixed together into our data set – one that increases and one that is flat. It then estimates the probabilities that each filibuster falls into these two categories. Second, filibusters involving at least one weak player must end by a specific point in time, t*, which we also do not observe. Our estimator is therefore quite similar to cure, or split population, duration models (Schmidt and Witte 1989), which assume that some proportion of the observations will never fail (since they have been “cured” of the “disease”), with the key distinction that ours incorporates an endogenous time threshold after which we know for certain which type of filibuster we observe.19

Our estimator therefore has four components linked through the likelihood function. First, one set of filibusters has an increasing shape that we model with a truncated Weibull duration model. Second, the other group of filibusters has a flat hazard rate that we model with an exponential duration model. While the single-shot version of the model predicts a hazard rate of exactly zero for filibusters involving two strong players, this seems excessively restrictive empirically. The exponential form allows for a flat hazard, which we expect to be “close” to zero relative to the Weibull hazard. More formally, such a hazard could emerge from our model when applied to multiple observations since data drawn from multiple iterations of the game with

19 For a formal derivation of this estimator, see our methods Appendix.
different maximal lengths lead in the limit to an exponential hazard. Third, we include a parameter for the endogenous time horizon, $t^*$. Any filibuster that ends after it must involve two strong players whereas ones that end before it could be of either type. Fourth, we include a logit equation that probabilistically assigns filibusters that end before $t^*$ to one of the two distinct hazards.

Together, these four pieces capture all of the distinct features of our model’s predictions about the duration of filibusters. In order to test predictions about individual parameters, we can include covariates in the Weibull and logit equations, since the hazard of filibusters involving at least one weak player decreases with the value of the issue to both sides and the initial probability of a strong Opposition (recall that we focus on Case 1) and the probability of a filibuster involving two strong players depends on the probability of a strong Majority (but not a strong Opposition). Finally, in order to estimate $t^*$ we estimate the model for all observed values and determine which gives the largest final log-likelihood.

6. Empirical Results

To evaluate how well our model fits filibustering behavior, we look first at data regarding duration and follow that with an analysis of frequency.

Duration Analysis

Testing whether observed filibusters match our predicted hazard rate constitutes the most important and precise test of our model. In particular, we expect the overall hazard function to be a mixture of two distinct pieces, with one component increasing from $t=0$ up to $t^*$ and another

\[\text{See the methods appendix for a justification of this based on the aggregation across a set of filibusters with uniformly distributed end points. The other features of the hazards are still preserved.}\]

\[\text{This is often referred to as a profile likelihood approach. See the methods Appendix for details.}\]
that remains constant and near zero from \( t=0 \) to \( t=1 \). Given this unusual shape it is extremely unlikely that such a hazard would emerge by chance. For now we put off inclusion of various covariates in order to focus directly on how closely the empirical duration of hazards corresponds to our prediction. Figure 3 plots the estimated hazards.\(^{22}\)

[Figure 3 Here]

The results match up remarkably with our predicted hazards: one hazard, representing filibusters with at least one weak player, increases sharply only to end at \( t^*=9 \) days whereas the other one, for those with two strong players, is relatively small. Further, we estimate that 46% of all filibusters involve two strong players. A likelihood ratio test comparison to a standard Weibull duration model applied to all filibusters produces a p-value less than .001. Further, the standard Weibull model is itself inconsistent with an exponential duration process for all filibusters (p<.032), suggesting that neither of the two special cases of our estimator is correct. Rather, the data represent a mixture of distinct duration processes. Given the unusual nature of our predicted hazards, we take these results as strong confirmation of our information-based theoretical model.

We can perform a more nuanced test by evaluating how the results depend on the value of the issue to both sides. These parameters enter in two places. First, the hazard for filibusters involving at least one weak player should be lower for more important issues. Second, as noted in Table 2 the endogenous time horizon, \( t^* \), should be greater for more important issues since weak players are willing to fight longer as the value of the issue increases.\(^{23}\) To test these predictions, we split our sample into filibusters on issues that are important to both sides (n=147)

\(^{22}\) The underlying parameters used to produce both Figure 3 and Figure 4 are reported in Table 3, in the columns labeled “All Filibusters” and “By Issue Type,” respectively; but are not very helpful for interpretation at this point. We discuss the results in this Table in more detail later in this section.

\(^{23}\) Mathematically, this is easy to see since \( t^* = 1 - \delta \).
and those that are relatively unimportant to both sides (n=35), leaving out those whose importance was indeterminate. We then apply our estimator to each of the samples and report the results in Figure 4.

[Figure 4 Here]

As with the “All Filibusters” results, we find strong evidence for our model, with each set of estimates exhibiting the heterogeneity predicted by informative filibustering. Further, a comparison across the results for the two levels of issue importance supports the predicted shifts. For important issues, the hazard for filibusters involving at least one weak player is much lower than that for unimportant issues. As shown in the fourth set of results in Table 3, which estimates these differences in one model, important issues have a significantly greater hazard than unimportant issues. Further, the endogenous time horizon decreases from nine for important issues to six for unimportant issues. This ordering is again what our theory predicts, since weak players should be willing to fight longer and drop out more slowly on issues that they value more.

The presence of the predicted hazard structure is strong confirmation of the model. But we also make a number of testable predictions about how the shape of the hazard involving at least one weak player changes with the model’s four parameters. Since we believe that Case 1 corresponds best to our interpretation of the existing literature, we focus our exposition on these predictions from Table 1. Thus, we expect that the hazard rate for filibusters on important issues will be smaller than those on unimportant issues. We also expect that the hazard will increase with the probability of a strong Opposition, corresponding to a positive coefficient for the 

24 Our ability to estimate \( t^* \) depends on the available values in the data. With only 35 observations, we are somewhat limited for unimportant issues. Most of the values are near 5 (specifically, 3, 4, 5, 6, 8, and 9), however, allowing us to conclude that it is at the very least a local maximum.
indicator variable for 1949-58, but that the other institutional regime variables will be insignificant.

[Table 3 Here]

The rightmost section of Table 3 (“All Filibusters with Covariates”) presents these results. We present three models with covariates: the first includes our issue importance variables, the second adds filibuster rules variables to measure the strength of the two sides, and the third adds some additional controls used in the literature. We add these variables to the Weibull duration component and also add the importance and rules variables to the logit equation in the bottom half of Table 3 corresponding to the probability that both sides are strong. As expected, important policies have a lower hazard rate, with significant coefficients for our High Importance Policy variable in all three models (we present the duration models in hazard form). Policies coded as “unclear” also reduce the hazard, although not as much as clearly important policies.25 We obtain more mixed results for our measures of $\gamma$ and $\delta$. We expected the two-thirds requirement (1949-58) variable to increase both the hazard and the probability of a filibuster with two strong players. It does neither. In fact, the logit equation indicates that it has a strong, negative effect on the probability of two strong players, implying that the probability of a strong-strong filibuster during this period was virtually zero.26 We also expected the three-fifths present and voting period (1975-85) and the post-cloture reform period (1986-1996) to have no effect on either. While the second model indicates that they both increase the hazard, the third

25 The differences between the two coefficients are not quite significant at the .05 level, but exceed or approach significance at the .10 level in the first two models.
26 This result should be taken with some caution since only six filibusters occur during this period. Five of them are on important issues and last fifteen or more days. We examined robustness by running the model with each observation omitted one at a time and found very little difference from the reported results.
shows no such effect, though it does indicate that the latter decreases the proportion of strong-strong filibusters.

These results underscore the value of our estimator: if we do not consider the possible effects of these rules on players’ beliefs about the strength of their opponent, as in the second to last model, they both incorrectly appear to influence the hazard. Yet these effects evaporate once we incorporate their influence on the type of filibuster, which makes sense since strong-strong filibusters have low hazard rates and a lower rate of occurrence during these two eras. The comparable standard Weibull model also indicates the same incorrect conclusion regarding these two variables, but we can reject it in favor our estimator with great confidence (p < .001). Thus, three of the four predictions for these variables receive support in the data. Finally, we note that the various control variables produce no significant findings.

Number of Filibusters

The analysis of filibuster durations is central to our argument and the most novel empirical contribution of our analysis. But our model also makes predictions regarding the probability that a filibuster takes place. These additional predictions not only give us an additional way to evaluate the veracity of the model, they also allow us to compare our results with existing treatments of filibuster frequency. Since we have count data, we estimate a negative binomial regression model. The statistical results are presented in Table 4 for both the aforementioned Beth and BLS measures of filibusters per year.

Columns 1 and 5 incorporate our primary explanatory variables. In every case, the sign predictions based on Case 1 are confirmed and the underlying variables are significant, with the exception of the policy importance ratio in the BLS data (though p=.11). Filibusters are more
likely to occur under conditions that favor the majority (i.e., during 1975-1985 and 1986-1996); less likely to occur under conditions that favor the opposition (i.e., during 1949-1958); and more likely to occur as the relative importance of the issue is greater for the majority party than the opposition. Our findings are especially surprising with respect to the 1975 reform. As noted, the conventional wisdom is that the 1975 reform should have resulted in fewer filibusters. Our results show that, if anything, it had the opposite effect.

[Table 4 Here]

The additional models add variables that BLS found to be significant. One of these additional variables influences our results: inclusion of an indicator variable for a Tracking System, which the Senate adopted in 1970, affects the significance of our Policy Importance variable and the Three-Fifths Present and Voting (1975-85) indicator.27 The latter is not surprising given that this time period overlaps so heavily with the tracking system ($r = 0.57$). Perhaps more surprisingly, it correlates with our Policy Importance ratio at 0.43. Together, the multiple correlation of tracking with the other four variables is 0.88, which helps explain the drop in significance when all five are included. Given these limitations, the results provide reasonable support for our model of filibustering.

7. Discussion

The filibuster is almost certainly the most well-known procedure used in the U.S. Senate. As Koger notes, it is a procedure used in other legislatures both within and outside of the U.S.. It is also an effective tool, resulting in hundreds of bills killed over the past century, as well as additional hundreds amended or reconsidered (Koger 2010, Figure 6.7). And it provides an

27 The system of multiple tracks was adopted in order to allow the Senate to proceed with business, on a separate “track,” even if one issue was tying up the first track (e.g., due to a filibuster).
arena in which we can learn about numerous other crucial aspects of politics – majorities versus opposition, the role of information, and the importance of the issues at stake, to name a few.

Our approach captures these central aspects of the filibuster. Majorities attempt to predict what their opponents will do, while opponents simultaneously try to predict the actions of the majority. In particular, each side is uncertain about the strength of the other side: as the filibuster plays out, each side learns from the actions and efforts of the other side.

In addition to capturing the central features of the filibuster, our incomplete information account provides testable hypotheses about the two key features that vary over time: how often filibusters occur, and how long they last. We test our model both by deriving predictions about the marginal effect of specific parameters, and more innovatively and compellingly by matching our theory’s split-population hazard rate to the empirical hazard rate of filibusters. Although ours is not the first study to explain the frequency of filibusters over time, it is the first to investigate variation in the duration of filibusters, giving us unique leverage on the informational aspect of filibustering. As shown in Figure 1, our incomplete information model predicts that the hazard ratio should represent a mixture of two distinct hazards: one monotonically increasing, endogenously truncated hazard for contests involving at least one weak player and another flat, small hazard for contests involving two strong players. This is exactly what we find. Furthermore, our analysis shows that policies that are more significant and salient have longer durations.

Our analysis speaks to three much-discussed aspects of the filibuster: the trivialization of the filibuster in recent years; proposed cloture reforms; and the nuclear option. First, the notion that the filibuster has become trivialized in recent years is widespread and has been voiced by former members of Congress (e.g., Harris 1993), political journalists (e.g., Will 1982), and
academics alike (e.g., Davidson 1989; Wawro and Schickler 2006). In this view, today’s filibuster neither conveys anything useful nor provides any information; rather, it serves only as a tactic of delay. Filibusters of the past, supposedly, were informative and conveyed important information about the intensity of preferences.

Until now, however, this account has been voiced but not systematically tested. And our evidence runs contrary: we find that modern-day filibusters follow the same structural pattern as those from the early twentieth century. Once we account for changes in players’ willingness to fight during these eras, we find no effect on the rate at which they quit. Rather, we find that changes in the duration of modern filibusters result from a substantial decrease in the chance of a strong majority encountering a strong opposition.

We therefore conclude that filibusters during both eras are consistent with the informational role described by our formal model (estimating the model separately on the pre- and post-1975 period further supports this), and provide information about an opponents’ willingness to stand up for an issue both before and after the major rules changes. Our findings are thus consistent with the argument put forth by Binder and Smith. While acknowledging that the filibuster is often used on trivial issues, they state:

Perhaps the greatest myth about the Senate filibuster is that it was once reserved for a few issues of utmost national importance, primarily the issues of slavery and civil rights, but that it has been used for increasingly narrow partisan and parochial purposes in recent decades….Although there is little question about the use of the filibuster for less important matters in recent decades, the received wisdom glorifies the history of the

28 Koger (2010) holds that the use of cloture has essentially substituted for attrition as the dominant response to obstruction in the modern era.
There is little empirical support for the conventional view about the past use of the filibuster (1997, 21). Our evidence concurs by showing that a significant portion of the reduction in filibuster length in from 1917-1993 is consistent with our theory, and therefore not indicative of a fundamental change in the filibuster. While our data limits our ability to speak about the current day filibuster, the (perceived) increase in usage and decrease in duration are also consistent with our theory.

A second implication of our analysis is that further proposed reforms of the cloture rule may in fact be misguided. One approach, advocated both by Senator Tom Harkin and by Sarah Binder and Steven Smith, calls for a “sliding scale” cloture rule that would drop the number of individuals required for cloture over time from the current 60 votes at the start of consideration of legislation down to a bare majority. If such a move is interpreted as increasing the probability of a strong majority, then by our analysis a tightening of the rule would have the opposite of the intended effect by increasing the frequency of filibusters and having no effect whatsoever on filibuster duration.

Finally, our results also have some bearing on the debate about the so-called “nuclear option.” It has been puzzling to observers why the Senate has not, in the face of unprecedented filibustering, simply moved to majority cloture. Such a move would so undermine the historical culture of the Senate that it would completely transform the institution; hence the term “nuclear option” (Wawro and Shickler, 2010; Shickler and Wawro, 2011). According to our model, however, it is only weak majorities that would gain from a move to majority rule.
Bibliography


