The Amicus Game

Peter Bils*
Lawrence Rothenberg†
Bradley C. Smith ‡

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*Department of Political Science, University of Rochester (phbils@gmail.com).
†Department of Political Science, University of Rochester (lawrence.rothenberg@rochester.edu).
‡Department of Political Science, Vanderbilt University (bradley.carl.smith@gmail.com)
Abstract

Despite amicus briefs becoming increasingly numerous in prior decades, and legal scholars and political scientists directing heightened attention toward ascertaining their causes and importance, we lack a microfounded model for understanding what we observe. Our analysis remedies this gap, modeling a world where there is a case about which potential filers can provide technical or legal information and others may sign on to a brief without adding such information, after which a pivotal judge may thoroughly examine briefs’ claims and then rules. Our results demonstrate that differing views of amicus curiae—as costly signals or as transmission of factual information—generate qualitatively different expectations of when briefs should be filed and what their influence should be. In doing so, we underscore the importance of heterogeneity among judges and brief filers on the informational impact of amicus briefs. For example, more competent judges discourage filings from those hoping that their briefs will not be rigorously assessed and ideologically extreme groups file more than their moderate counterparts. We also show that the role of public opinion, as captured by endorsements of briefs, may be conditioned by judicial bias and uncertainty over the state of the world. Additionally, our findings indicate that empirical analyses might be stymied by a variety of concerns raised by our analysis, e.g., there may be selection problems in assessing the influence of briefs, as under reasonable conditions a group’s failure to file a brief may provide a judicial decision-maker with information that goes unaccounted for in empirical analyses to date. This may help explain why empirical research has been both contradictory and produced difficult to reconcile results.
1 Introduction

Amicus curiae briefs, although long-existing (e.g., Kochevar (2013)) and employed in a variety of contexts, emerged to great prominence in the second-half of the 20th century. Notably, their numbers proliferated in the United States court system, especially in the Supreme Court (e.g., Owens and Epstein (2005); Salzman, Williams and Calvin (2011)). Various reasons are offered for this development, including a dramatic rise in the count of interest groups, the subsequent reduction in the Supreme Court docket, a more liberal interpretation of Court rules allowing briefs from those other than the Solicitor General and state Attorneys General, and the emergence of a Supreme Court bar which both sells amicus briefs and employs them as advertising for firm quality (e.g., Ward (2007), Howard (2015), Larsen (2017)).

For judicial decision-making, amicus briefs are considered fundamental for providing factual evidence to the courts, albeit "funneled through the screen of advocacy" (Larsen (2014), p. 1757; on the uniqueness of amicus information, see Collins Jr, Corley and Hamner (2014)). Friends of the court briefs may offer perspectives and data about how the world works and how a judicial ruling may impact society that would not be found in briefs authored by plaintiffs or defendants. While many issues are ideologically polarizing (e.g., Swenson (2016)), a good amicus brief is typically portrayed as valuable for providing distinct, hard, evidence to judges trying to make tough legal decisions rather than as a simple statement of general ideological leanings. Even avowedly liberal or conservative interest groups (as compared to more conventional law firms), or state Attorneys General representing Republican or Democratic constituencies, sometimes make filings that are inconsistent with their reputations (e.g., Scott (2013), Goelzhauser and Vouvalis (2015), Lemos and Quinn (2015)).

Accordingly, in recent years, the amicus brief production process, particularly for filings seen as potentially viable rather than as mere dross with little chance of engaging judges (a critique of many briefs most associated with scholar and Judge Richard Posner; for discussions, see Lynch (2004), Garcia (2008)), has received considerable scholarly attention (e.g., Zuber, Sommer and Parent (2015); Larsen and Devins (2016); Solimine

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1 Although there has been growth, compared to the changes at the Supreme Court the number of amicus briefs in the U.S. appeals courts remain rather modest (e.g., Martinek (2006), Gidiere III (2012)). The use of amicus at the Supreme Court level is also very high relative to other nation-states (Collins Jr and McCarthy (2017)).

2 Throughout our discussion we will assume that judges have lifetime tenure. The effects of briefs may be different if judges face reelection constraints (e.g., Kane (2017)).
The need for coordination, the importance of a lack of redundancy (but see Collins Jr, Corley and Hamner (2015)), and the potential for fewer high quality briefs being better than an avalanche of undistinguished treatises have all been highlighted.

In a similar light, scholars have increasingly focused on the seeming influences of amicus briefs and identifying the underlying processes at work. Descriptively, and not surprisingly given their rise in numbers, briefs are more likely to be directly cited in opinions (e.g., Owens and Epstein (2005)) or to have their language lifted from them than previously (e.g., Collins Jr, Corley and Hamner (2015); see, also, Sim, Routledge and Smith (2015)). In some instances, the sheer number of briefs, conditioned by the ideological position being advanced, has been found to be important for outcomes or getting cases on the Supreme Court docket, but—consistent with the notion that quality and credibility likely trump quantity—results have been inconsistent or asymmetric (e.g., Collins Jr, Corley and Hamner (2015); Hazelton, Hinkle and Spriggs II (N.d.)). Finally, and related to the possibility that briefs need to be high quality and from well-regarded sources, others have emphasized the importance of networks collaborating together in their friendship efforts. Most notably, Box-Steffensmeier, Christenson and Hitt (2013) (see also Box-Steffensmeier and Christenson (2014)) conclude that better connected groups are more successful than others in influencing judicial behavior.

Despite all of these efforts and the corresponding insights, what has been lacking are clear microfoundations for amicus behavior. "The theoretical motivation for these studies [of amicus briefs] are not as well developed as it could be," one recent review of the literature acknowledges (Perkins and Collins Jr (2017) , p. 367). There are many empirical findings and there is much conventional wisdom, and there are appeals to various theories of judicial behavior such as those grounded in political attitudes or legal perspectives, but an analytic framework formally microfounding the amicus process that makes full sense of such claims is lacking. Why and when would, for example, a group with a known ideological stance expend resources to try and influence a pivotal justice whose judicial attitudes are also well-understood? Providing a theoretical understanding of this behavior is crucial for interpreting empirical studies of amicus briefs. Consider, for example, the assertion by (Box-Steffensmeier, Christenson and Hitt, 2013, p. 450) that "the appearance of a highly central liberal interest group may signal [to conservative justices] that they should vote against the side supported by the liberal interest group (italics added).” If so, this implies that liberal groups aware of the outcome that their actions will generate should abstain from providing a brief if a conservative judge is likely to be pivotal and

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See Posner’s decision in *Voices for Choices v. Ill. Bell Tel. Co.*, 339 F.3d 542 (7th Cir. 2003).
swayed, on average, in the wrong direction.

Put differently, briefs are costly efforts that are likely driven principally by a desire to influence outcomes (e.g., Collins Jr (2008)), although organizational maintenance, self-promotion, or other symbolic considerations could play a role in some situations for some types of brief producers (Hansford, 2004). As such, it is imperative that potential filers consider a situation’s context and what motivates judicial decision-makers and others who might file a brief. Judges, who on the one hand are frequently hungry for valuable information, on the other hand are also well-aware that those pushing briefs have private interests that might conflict with their own predilections and attitudes. Judicial motivations, information, and strategic choice behavior must all be incorporated into any meaningful analysis of amicus choices and effects and, absent such integration, making full sense of what is observed empirically may be problematic.

Hence, the following analysis represents the first attempt that we know of to build a microfounded theory of amicus behavior. We specify a game theoretic model in which a potential purveyor of an amicus brief that might sway a pivotal judge decides whether to pay the cost of producing a brief with hard, verifiable, information that might be useful to the judicial decision-maker. If not, the group has the option of doing nothing. Other, less vested, affected societal interests can then endorse a brief, providing additional support without furnishing further technical information. Subsequently, the judge may or may not read and extract the information contained in each brief and decides the issue. Given its setup, our amicus model captures both predominant views of briefs, as signals about the case by interested parties and as a means of providing persuasive information to the court.

Our analysis highlights the importance of heterogeneity in the amicus process. In particular, we characterize the role of both judicial and filer heterogeneity on outcomes. First, acknowledging that judges may differ in their ability to extract relevant information from briefs (Choi and Gulati, 2004), we study how expectations about judge ability impact the filing decisions of groups. We demonstrate that when judicial ability is sufficiently high, groups exhibit “good” filing behavior. In particular, when the probability that a judge is able to extract the factual content of an amicus brief is high, groups only file when they receive a signal consistent with their preference. When a judge is likely to extract the hard information contained in a brief, the mere threat of the truth being revealed encourages good filing behavior. Thus, competent judges are able to draw more precise information from filings even when they do not engage in verification. This finding provides a strategic logic supportive of calls to reform the filing process to encourage
transparency and standards of evidence (Larsen, 2014).

As for the influence of filer heterogeneity on the amicus process, we detail how variation in filer ideology can account for observed patterns of amicus filings. In particular, we show that when a group is ideologically extreme, in that it highly values its preferred outcome relative to the alternative being considered by the judge, it is relatively likely to file. This suggests that the steady increase in amicus filings in the U.S. in recent years may be causally associated with increasing ideological polarization. On the other hand, we demonstrate that relatively moderate groups, with little value over the interest at stake, have little incentive to file.

Our results also have implications for empirical studies of amicus influence. By providing a novel microfounded theory we demonstrate potential difficulties in empirically assessing such influence. In particular, the model highlights an important force that remains unaccounted for in existing empirical studies of amicus behavior: That the absence of a filing by an interested group provides a judge with relevant information. This finding is rooted in the strategic nature of information in our model. Even when a judge does not observe a filing’s specific factual content, she can infer a group’s hard information from its strategic behavior. Similarly, when a group foregoes filing, a judge can draw an inference about its informational content based on knowledge of the group’s relevant characteristics. As such, the model identifies an important selection effect, presenting a challenge for future empirical studies of amicus influence.

An additional empirical implication of our model involves the potential influence of public opinion on judicial decisions. While there has been considerable interest in detecting such influence, there is no empirical consensus over how and whether public opinion shapes judicial decisions (Mishler and Sheehan, 1993; Norpoth et al., 1994; Hall, 2014; Owens and Wohlfarth, 2017). By formally defining public influence in the context of our model, we demonstrate that, while uncertainty and judicial ideology can interact to create conditions favorable for public influence, this relationship can vary dramatically. For example, while intuition may lead one to expect that uncertainty is always positively associated with public influence, in our model this only occurs when a judge is relatively unbiased. In sum, our results suggest that accounting for uncertainty, judicial ideology, and their interaction is crucial for empirically assessing public opinion’s influence on judicial decisions.

The remainder of our paper proceeds as follows. Section 2 defines our formal model of the filings process. Section 3 establishes existence of an equilibrium with intuitive behavior, and analyzes a one-filer version of the model to illustrate baseline behavior. Section 4
presents a number of substantive results indicating the role of judicial heterogeneity, filer characteristics, and public influence on equilibrium behavior. The final section concludes. The appendix provides proofs for all propositions.

2 The Amicus Model

We now specify our amicus model in which some strategic interests decide whether to file a brief or not and others decide whether to endorse a brief if filed. This model is most related to those found in the literature on persuasion games (Milgrom (1981), Milgrom and Roberts (1986)). In these models persuasion occurs through the provision of "hard information," by which we mean the claims about which disagreement is difficult post-verification (Ijiri, 1975). In turn, the information provision structure is most similar to (Emons and Fluet (2016)), as we assume that there are private costs for reporting information, which breaks the unraveling result by which all information is revealed (Milgrom (1981)). However, relevant persuasion models typically assume that the decision-maker always observes the information revealed by the sender. By contrast, while we assume that a brief contains hard information, filing a brief does not automatically imply that the judge observes this information. With some probability the brief will be reviewed and the information verified and with some probability only its filing will be observed by the judge. These alternatives are consistent with different foci in the literature, one stressing a brief’s factual content and another emphasizing the sheer act of filing. Thus, a brief’s filing acts as either hard information, from which the judge verifiably learns the group’s private information given that they elect to engage in what we will refer to as information extraction, or as a costly signal, from which the judge infers the group’s information based on strategic behavior but does not learn it directly.

We show that what occurs varies significantly depending on the extraction probability by which the judge ascertains the information contained in the filer’s brief through verification. In particular, this probability has a strong effect on the strategies of biased groups. With a high enough extraction probability our model works similarly to when information is fully verified via adoption of "sanitization strategies," by which only positive information is sent (Shin (1994)). With no information extraction the game works far differently, e.g., there is always an equilibrium in which no biased group files. Finally, at intermediate extraction levels sanitization strategies may not hold and groups sometimes offer information even when news about the state of the world is bad.

Specifically, in our amicus model a judge makes a decision, \( d \in \{d_0, d_1\} \), about an
issue. Besides a plaintiff and a defendant, whom we assume are exogenously chosen and are not strategic players in our analysis, there are outside actors with the opportunity to weigh in by filing an amicus brief or to sign on as supportive of a brief that they did not author. Put differently, as is standard in many proceedings, we assume that there are actors with vested interests besides the plaintiff or defendant with the option to be part of the process to try and influence judicial outputs.

Given that producing a meaningful brief is an expensive endeavor for which one must have resources and would, therefore, require considerable interests being at stake, we further distinguish among the outside players. We call the set of $N$ actors potentially possessing the will and the capacity to produce a high quality amicus as groups. Alternatively, there are those who are interested, in a broad sense representing the different affected societal constituencies, but who are not disposed to expend the requisite resources regardless of the case’s specifics. However, they possess the option of expressing support for either decision by signing on to a brief, conditional on a meaningful brief with which they agree being produced. We distinguish this second set as a unit mass of interested actors whom we will call individuals.

Consistent with standard beliefs about what kinds of cases might induce an amicus filing, we assume that there are technical or legal arguments that are relevant but remain unknown to the judge before the case proceeds. Let $\omega \in \{0, 1\}$ denote the decision supported by the case’s technical and legal merits. As is standard in incomplete information models, we assume the actors have a common prior belief over the state; in particular, we assume that $\omega = 1$ with probability $q$ and $\omega = 0$ with probability $1 - q$. Let the judge’s belief that $\omega = 1$ at any stage of the game be $\mu_J \in [0, 1]$.

Our game begins after a case is placed on the docket, and proceeds in three stages. First, groups choose to file a brief in favor of decision $d_0$, file in favor of decision $d_1$, or do not file. Denote group $i$’s choice as $a_i \in \{f_0, f_1, n\}$. Next, individuals communicate their preferences by signing onto a brief, i.e., they state support for decision $d_0$ or $d_1$. Finally,
the judge weighs this information against her own preferences and issues a decision.

In the initial decision stage each group observes a signal about \( \omega \), denoted \( s_i \in \{0, 1\} \). With probability \( \pi_i > \frac{1}{2} \) group \( i \)'s signal is correct and with probability \( 1 - \pi_i \) it observes the wrong state. This captures heterogeneity in each group's expertise in the relevant issue-area. Subsequently each group \( i \) chooses whether to file a brief, \( a_i \in \{0, 1\} \). If a brief is filed the group incurs a cost \( c_i \), where \( c_i \) is private information to group \( i \) and is distributed according to the cdf \( G_i(c_i) \) with associated pdf \( g_i(c_i) \) and full support on \([0, C]\). This represents the costs of writing and filing a brief. As these costs may vary depending on the filer, we allow the cdf \( G_i \) to differ for each group, e.g., a law firm, a firm with in-house lawyers, and a grassroots interest group can all have different capacities. Furthermore, costs are private as each individual group knows best the costs that it will expend in writing and filing a brief.\(^7\) If the group files it may choose to write a brief that, if read, reveals the group's signal to the judge. This type of brief contains hard information for the judge. On the other hand, the group may also choose to file a brief and forgo including such hard information.

When the judge receives a brief we assume that there is some probability that she or her staff reads and verifies the claims advanced. Thus, when an amicus brief is filed by group \( i \), with probability \( p_i \in (0, 1] \) the court extracts the relevant information and the judge learns group \( i \)'s signal. Conversely, with probability \( 1 - p_i \) the judge does not read or does not have the expertise to evaluate the information provided by the brief and observes that the group filed and which decision the brief endorses but sees none of the information to which the group had access. We can think of the former circumstance as approximating the idea that briefs furnish relevant technical and legal information that the judge and her staff can verify, while the latter roughly corresponds to a world where the brief is simply a costly signal in its own right about how the group feels. While this parameter is interpretable as the actual probability that the judge reads the brief or her staff forwards the information, or as a judicial expertise on the topic, we can otherwise analyze it to derive the implications of different conceptions of amicus briefs. We will see that, in equilibrium, if the judge reads a brief that lacks hard information supporting the

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\(^7\)One may wonder if a group would want to demonstrate to the judge that it incurred high costs as an additional signal of brief quality. Substantively, however, briefs are typically limited to 30-50 pages, leaving little room for groups to demonstrate such expenditures as well as to provide information. Theoretically, in our model if the judge reads and verifies the brief she observes the group's information, so demonstrating high costs would be redundant. Furthermore, as filings originating from higher cost types would lead to more favorable judicial inferences, lower cost producers would lack an incentive to reveal truthfully their costs in the first place. Thus, our assumption that costs are private to the group seems a reasonable approximation of the real world.
group’s preferred policy choice then she infers that the group’s information was negative. Thus, even reading an uninformative brief provides the judge with information about the group’s signal.

If the group decision stage produces no briefs then we move directly to the judicial decision stage. Alternatively, if briefs are filed then we proceed to the individual decision stage. Here each individual can decide whether to signal its support by signing onto the brief if only one group files or onto one side or the other if both sides file by stating whether it supports decision $d_1$ or decision $d_0$.\footnote{We could allow individuals to sit the process out. However, given the structure of payoffs in our amicus model, such abstention is weakly dominated in equilibrium.}

Finally, we advance to the judicial decision stage. Here the judge rules by deciding on $d_0$ or $d_1$ and the game ends.\footnote{We could make the judge’s choice more consistent with a court’s ability to author opinions achieving nuanced outcomes by assuming that she can choose any alternative between $d_0$ and $d_1$. However, our results would be comparable to those detailed in the following sections and, as such, we utilize the simpler framework for our analysis.}

Having laid out the game’s structure, we now specify the players’ utilities. We assume that the judge cares about getting the choice right on legal or technical grounds. Additionally, the judge prefers to produce a ruling that the individuals, who to reiterate roughly represent the affected societal interests, find favorable (e.g., Kearney and Merrill (2000)). Thus, the judge’s utility for making each decision depends on both the case’s technical merits and the broader effect of the decision on the individuals. Our specification of the judge’s payoff is also flexible enough to accommodate an ideological bias in favor of one decision, as well as different weightings on technical and societal motivations. Consequently, the judge’s payoff for choosing $d = d_1$ is $u_1(\mu, \theta)$, where $\theta$ is the proportion of individuals that state support for decision $d_1$. We assume that $u_1$ is strictly increasing and differentiable in both $\mu$ and $\theta$. Conversely, the judge’s payoff for $d = d_0$ is $u_0(\mu, \theta)$ and is strictly decreasing and differentiable in both $\mu$ and $\theta$.\footnote{To more closely match decision-making on multi-member courts, an alternative formulation of our model would specify multiple justices who differ in their ideological biases toward each decision but place the same relative weights on $\omega$ and $\theta$. Now, after observing the filing and signing on stages, each justice would vote over the choices associated with $d_0$ or $d_1$, with the winning alternative being the implemented decision. In this setup, the median justice’s vote will be decisive. As such, analyzing the one decision-maker setup is without loss of generality, since we can just view her as the median judge. Similarly, if we instead consider our model as a theory of amicus briefs and writs of certiorari we would want to account for multi-member courts and, in particular, the rule of four. However, if justices can be ordered by their inclination to hear the case then there would be a unique judge that the groups would target.} We also assume $u_1(1,1) > u_0(1,1)$ and $u_1(0,0) < u_0(0,0)$, as otherwise the judge would always make the same decision for every $\omega$ and $\theta$.

As for the groups, each group $i \in \{1, \ldots, N\}$ has known preferences over outcomes
that can depend on the state of the world $\omega$. Specifically, group $i$ receives a payoff $v_i(d|\omega) \in (0, C]$ if the judge’s decision is $d$ and the state of the world is $\omega$. The $v_i(d|\omega)$ parameters are common knowledge and with larger values representing greater stakes of the issue to group $i$ or greater asymmetries in the values representing that group $i$ has more extreme ideological preferences over outcomes. Note that this formulation of preferences can capture a number of differing motivations for groups. First, a group may prefer that the judge makes the same decision, regardless of the relevant legal or technical facts, e.g., $v_i(d_1|1) = v_i(d_1|0) > v_i(d_0|1) = v_i(d_0|0)$. Second, a group may only care that the decision matches the state of the world, e.g., $v_i(d_1|1) = v_i(d_0|0) > v_i(d_1|0) > v_i(d_0|1)$. Finally, a group may want outcomes to correspond to the state of the world but be biased towards one decision, e.g., $v_i(d_1|1) > v_i(d_0|0) > v_i(d_1|0) > v_i(d_0|1)$. The only restriction on preferences that we place is that for each group $i$ there exists a state $\tilde{\omega}$ such that $v_i(d_1|\omega) \geq v_i(d_{\omega \neq \tilde{\omega}}|\tilde{\omega})$. Thus, for each group there is at least one state of the world for which it weakly prefers that the decision matches the state. This assumption rules out groups that strictly prefer that the opposite decision be made in every state of the world.

Using the primitive characteristics of the groups, their preferences, quality of information, and the prior belief over the state, we organize groups into three categories. This categorization will help characterize group behavior and provide intuition for the analysis of the model.

**Definition 1.** For each group $i$ we derive cut-points $\mu^*_i$, $\mu_i$, and $\overline{\mu}_i$. The cut-point $\mu^*_i$ is a function of group $i$’s preferences, $v_i(d|\omega)$, and $\mu^*_i \in \mathbb{R}$. The cut-points $\mu_i$ and $\overline{\mu}_i$ are functions of the accuracy of group $i$’s signal, $\pi_i$, and the prior belief, $q$. Furthermore, $0 < \mu_i < \overline{\mu}_i < 1$.

1. If $\mu^*_i < \mu_i$ then we say group $i$ is **biased in favor of decision** $d_1$.
2. If $\mu^*_i \in [\mu_i, \overline{\mu}_i]$ then we say group $i$ is **moderate**.
3. If $\mu^*_i > \overline{\mu}_i$ then we say group $i$ is **biased in favor of decision** $d_0$.

These definitions provide precise characterization of each group’s preferred decision after observing its signal. Intuitively, if group $i$ is biased in favor of decision $d$ then group $i$ wants the same decision to be made following either signal $s_i \in \{0, 1\}$. This bias can arise from a number of sources. First, the group’s preferences may be independent of the state of the world. Second, the group’s preferred decision may depend on the state of the world, but its utility when the decision it is biased towards is made and matches the state is much larger than its utility for making the other decision and matching the
state. Third, the group may want the decision to match the state but the quality of the
group’s information may be low. In this case, the group’s signal does not shift its prior
belief about the state of the world by very much and so the group prefers the same policy
after observing its signal as it did beforehand. On the other hand, moderate groups are
those for which its preferred decision changes based on the information it learns through
its signal.

While the individuals also have preferences over the case’s outcome, their preferences
are unknown ahead of time. An individual receives a positive payoff if the judge’s ruling is
favorable and a payoff of 0 if it is not. We assume that the individuals use weakly dominant
strategies when deciding to sign on and endorse a side. As such, each individual truthfully
reveals which side she supports and \( \theta \) is equivalent to the true proportion of support for
decision 1 amongst individuals. Given this equivalence, we just employ the parameter \( \theta \)
and assume that, ex ante, the other actors believe that the support level for decision
\( d_1 \) is drawn from a continuous distribution \( F(\theta) \) that is independent of \( \omega \).\(^{11}\)
Thus, in equilibrium an individual’s signing on to a brief simply acts as a shock to the judge’s
preferences. Consequently, as groups are far more impactful, our analysis principally
focuses on their decisions (although we will return to the importance of individual choices
in our discussion of public opinion). Note, however, that groups anticipate the influence of
individuals and, thus, the latter’s preferences play an important role in a group’s calculus
when deciding to file an amicus brief in the first place.

To recap, our amicus brief game proceeds as follows:

1. The case is placed on the docket.

2. Nature determines which decision the legal and technical merits of the case favors,
\( \omega \in \{0, 1\} \).

3. Each group \( i \in \{1, \ldots, N\} \) observes a private signal about \( \omega \), \( s_i \in \{0, 1\} \), which is
correct with probability \( \pi_i \).

4. In the first stage of the process, each group decides whether or not to file an amicus
brief. If group \( i \) files a brief then it incurs a privately known cost \( c_i \).

5. In the second stage, each individual states support for decision \( d_0 \) or \( d_1 \). Individu-
als’ preferences are unknown ex ante and \( \theta \) denotes the proportion of individuals

\(^{11}\)Individuals may also care about the technical information represented by \( \omega \). We could allow \( F \) to
depend explicitly on \( \mu \) and assume if \( d_1 \) is more likely to be the correct decision in terms of \( \omega \) then the
probability that an individual prefers \( d_1 \) weakly increases. As this does not qualitatively impact our
results we suppress this possibility to simplify the exposition.
supporting $d_1$.

6. If group $i$ files then with probability $p_i$ the judge learns group $i$’s information and with probability $1 - p_i$ the judge only observes that the group filed.

7. In the final stage, the judge updates her beliefs and makes a decision, $d \in \{d_0, d_1\}$.

8. The judge receives utility $u_d(\mu_J, \theta)$; group $i$ gets utility $v_i$ if the decision matches its preferred decision and 0 otherwise; each individual gets a positive payoff if the final outcome is favorable and 0 otherwise.

Before continuing to our analysis we pause to comment on a novel feature of our model. In particular, the technology of information exchange is distinct from that of similar persuasion models. When the group files it reveals its signal truthfully. However, the judge does not actually learn the information contained in a group’s brief with certainty. The probability that the judge learns the signal, conditional on filing, is the parameter $p_i$. Broadly speaking this is interpretable as the probability that the judge actually reads the brief, the probability that the judge understands the technical arguments put forth in the brief, or, relatedly, the complexity of the argument made by the group. As alluded to at the beginning of this section, we term this feature of communication extractable information. If the judge does understand or read the brief then she learns the group’s signal.

This differs from verifiable information in which the judge always observes group’s information but there is some probability that the judge checks that the information in the brief is correct and could punish the group for lying. Generally speaking, the ability to extract information is a prerequisite for information verification. With a probability of verification the group would have some incentive to provide false information and hope that it remains unverified. In our model, information is always verified conditional on the information being extracted. Thus, one interpretation of the parameter $p_i$ is that it measures differences in judicial expertise on the case at hand. To make an analogy, when reading a mathematical argument verification would correspond to going through and checking that the arguments are correct whereas extraction focuses on the ability of the reader to understand the arguments in the first place. Given that judges and their staffs have limited time to read every brief and our interest in differences in judicial expertise, we focus on the probability of extraction rather than of verification.\footnote{Thus, our model differs from related persuasion models (e.g., Milgrom (1981), Emons and Fluet (2016)) that take information extraction (and verification) as given. It also contrasts with models that}
3 Equilibrium Analysis

As our model features incomplete information, we solve our amicus brief game using perfect Bayesian equilibrium. In particular, consistent with the equilibrium form that is often focused upon when models with private information over costs are considered, we study a selection of perfect Bayesian equilibrium that we call cut-point equilibrium that distinguishes between where there is and is not a group filing. In our case a cut-point equilibrium has three desirable properties (i) actions are in pure strategies, (ii) each group’s decision is monotonic in its costs, and (iii) there are no off-path actions. Behavior in a cut-point equilibrium is characterized by the following conditions for optimal decision-making for each of the three types of actors.

We begin with equilibrium judicial decision-making. Define a profile of outcomes as $o = (o_1, ... o_N)$. Specifically, for each group $i$, $o_i \in \{n, f0, f1, 0, 1\}$ denotes whether the judge actually observes the group’s signal as compared to just whether the group did or did not file. Consistent with work studying judicial use of amicus briefs (e.g., Larsen (2014)), the judge in our model takes into account each group’s bias and incentives to influence her decision and rationally updates her belief over $\omega$. In particular, the judge’s belief that $\omega = 1$ following outcome $o$ is $\mu_J(o)$, and it is derived via Bayes’ rule whenever possible. Additionally, the judge observes the support of individuals for each decision, $\theta$, before making her decision. For the judge’s choice to be optimal, if $u_1(\mu_J(o), \theta) \geq u_0(\mu_J(o), \theta)$ then she must choose $d = d_1$. On the other hand, if $u_1(\mu_J(o), \theta) < u_0(\mu_J(o), \theta)$ then the judge must choose $d = d_0$.\textsuperscript{13,14} We characterize the judge’s decision based on the level of support from individuals that is needed for the judge to choose $d_1$, after the groups have filed.

As for individuals, as noted in the model section we assume that they use weakly dominant strategies when deciding to sign on to one side or the other. This assumption is common in related voting models with a continuum of voters and rules out implausible study intermediate levels of information verification or costs for manipulating information, as they again assume that message information is always observed (Kartik (2009)). Finally, our model contrasts with studies of how informational complexity or language can act as barrier to communication (Cremer, Gargano and Prat (2007), Blume and Board (2013)), as such research has generally focused on how complexity affects coordination between players and on non-verifiable information (Dewatripont and Tirole (2005), Sobel (2012)).

\textsuperscript{13}While we we assume that at indifference the judge chooses $d = d_1$, this is inconsequential as the probability that the realization of $\theta$ leads to judicial indifference is zero.

\textsuperscript{14}When no group files a brief the judge retains her prior belief over $\theta$. In this case, if $\int_0^1 u_1(\mu_J(o), \theta)f(\theta)d\theta \geq \int_0^1 u_0(\mu_J(o), \theta)f(\theta)d\theta$ then the judge chooses $d = d_1$ and, otherwise, she chooses $d = d_0$. Note, as long as one group files a brief the supporters of that side are able to sign on and so the judge is able to infer $\theta$. 

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behavior that can arise because nobody is decisive. In our context this assumption implies that an individual supports a filed brief if and only if it corresponds to her preferred decision.

Finally, we turn to each group’s decision of whether or not to file. As the judge cannot observe a group’s cost, she forms expectations from whether the group does or does not file and adjusts her beliefs accordingly. Furthermore, given that all groups make their filing decisions simultaneously, each forms expectations about the others’ filing behavior. Thus, each group accounts for the judge’s expectations, its own expectations about whether other groups will file, and its expected support from individuals. In a cut-point equilibrium we assume that group $i$’s strategy is characterized by a cut-point $\tau_i(s_i) \geq 0$ such that, after observing signal $s_i$, if $c_i \leq \tau_i(s_i)$ then the group files and if $c_i > \tau_i(s_i)$ then it does not. Let $\hat{c}$ be the conjectured set of cut-points used by groups other than $i$. Given these conjectures, the group files if after observing signal $s_i \in \{0, 1\}$ its expected utility for filing is greater than its expected utility for not filing, $\mathbb{E}[v_i(d|\omega)|s_i, \hat{c}] - c_i \geq \mathbb{E}[v_i(d|\omega)|n, s_i, \hat{c}]$. This results in a group filing following signal $s_i$ if its cost is below a cut-point $\tau_i(s_i)$.

Of course, while it may be optimal for a single group to use such a strategy given its expectations about the behavior of the other players, equilibrium requires that this optimality holds simultaneously for every group, given the strategies of the others. Crucial to this characterization is that groups are expected by one another, and the judge, to file according to a cut-point strategy. In equilibrium these expectations must be consistent with the groups’ actual strategies. Moreover, the group’s filing strategy must be optimal given the judge’s beliefs about the group’s information. Thus, our initial task is to establish whether such mutually reinforcing cut-points exist. Our first proposition provides a positive answer, establishing that a cut-point equilibrium exists. However, we can go beyond merely showing that such an equilibrium will exist. In particular, a byproduct of the existence argument is a characterization of these equilibria demonstrates that these cut-points must have an intuitive ordering based on group preferences.

**Proposition 1. (Existence and characterization)**

1. A cut-point equilibrium exists.

2. In any cut-point equilibrium if group $i$ is biased towards decision $d_1$ then $\tau_i(1) > \tau_i(0) \geq 0$. By contrast, if group $i$ is biased towards decision $d_0$ then $\tau_i(0) > \tau_i(1) \geq 0$.

3. For a given set of outcomes $o$ there exists a unique $\bar{\theta}(\mu(o))$ such that if $\theta \geq \bar{\theta}(\mu(o))$ then the judge chooses $d = d_1$; otherwise, if $\theta < \bar{\theta}(\mu(o))$ then the judge chooses $d = d_0$. 

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Importantly, in equilibrium the costs for which a group is willing to file or not is a function of its signal.\textsuperscript{15} As shown in Figure 1, the group files more often when it has favorable information. This difference in cut-points enables the judge to infer information about a group’s signal just from observing whether the group filed. As the group files more often with a favorable signal, if the judge only observes that the group filed then she updates her beliefs in a way that is favorable towards the group. That the group files more often when it has favorable information is due to the probability that the judge actually reads the information contained in the brief. The possibility of judicial extraction and verification makes filing riskier to the group when its information is unfavorable information and, thus, it is unwilling to incur high filing costs. On the other hand, with sufficiently low costs the group still sometimes files despite unfavorable information, as it hopes that the judge will not extract and her decision is influenced in a manner favorable to the group.

\begin{figure}[h]
  \centering
  \includegraphics[width=\textwidth]{figure1.png}
  \caption{Group $i$’s decisions under a cut-point strategy when it prefers $d_1$ over $d_0$}
  \end{figure}

Note: On the left side of the diagram, groups have very low filing costs and filing occurs no matter what signal is received; on the right side of the diagram, filing is prohibitively costly and filing never occurs regardless of signal; and in the shaded middle region costs are at an intermediate level and groups file conditional upon observing a favorable signal.

To clarify both how the judge’s decision-making is affected by the group’s filing strategy and the trade-offs that the group faces in deciding whether to file, we begin by studying a special case of our model where only one interest group has the capacity to file.

\textsuperscript{15}Note, even after restricting attention to equilibria with a cut-point form, multiple cut-point equilibrium may exist. This is due to different judicial expectations over cut-points possibly leading to different solutions to the group’s indifference conditions.
an amicus brief. In analyzing this setting, we contrast the two views of amicus briefs—as informationally relevant or as a costly signal about the preferred outcome without substantiation. We consider extreme cases of the model to highlight a group’s incentives to provide information. In doing so we show how the intuitive, and empirically plausible, properties of cut-point equilibria break down in these extreme instances. This case also serves as a benchmark for understanding how adding more groups affects outcomes.

Hence, we assume that \( N = 1 \), and that the group prefers decision \( d_1, \delta_1 = d_1 \). To make the actors’ incentives more transparent we further parameterize this one group model by setting \( u_0(\mu, \theta) = 1 - \mu + 1 - \theta \) and \( u_1(\mu, \theta) = \mu + \theta \). Furthermore, assume that \( \theta \) and \( c_1 \) are independently drawn from a uniform distribution over \([0, 1]\).

**Remark 1.** If the judge’s prior belief that \( \omega = 1 \) is greater than \( 1/2 \) then there exists an equilibrium in which the group never files, no individuals sign on, and the judge chooses \( d_1 \).

If there is only one group and it does not file then there is no opportunity for the individuals to sign on to show support. The judge’s decision in this case depends only on her updated belief over \( \omega \) and her prior belief over \( \theta \). Thus, if the judge has a prior informational bias towards the group’s preferred decision she always chooses \( d_1 \). In the one group setting this results in the group never filing and guaranteeing its preferred decision at no cost. For the remainder of this section assume that the judge is biased against the group, so that if it does not file then the judge will rule against the group’s preferred decision.

We now turn to comparing the influence of the group under contrasting assumptions about the role of briefs. Recall that setting \( p_1 = 1 \) captures the case where the judge always learns the information in the group’s brief, and setting \( p_1 = 0 \) corresponds to filing being purely costly signaling. The following results consider each case in turn.

Consistent with the strand of the literature characterizing briefs as primarily informational, we first examine what happens if the judge always reads the brief to extract its hard information.

**Remark 2.** If the amicus brief is always read when filed, \( p_1 = 1 \), then the following hold:

1. \( 0 = \bar{c}_1(0) < \bar{c}_1(1) \).
2. \( \bar{c}_1(1) \) is increasing in \( v_1 \).

\(^{16}\)This type of result would also obtain if the judge was ideologically biased towards the group’s preferred outcome.
3. \( v_1(1) \) is increasing in \( \pi_1 \).

Under these conditions, the group plays a sanitization strategy by which it discloses only favorable observations and never files in the unfavorable state (Shin (1994)). A byproduct is that, given the judge always reads the brief, the group appears to more often influence the judge’s decision as it becomes more extreme or as its information quality improves. However, any inference concerning group influence needs to account for this dynamic’s flip side, which is that the more extreme or the better informed the group the bigger the effect that failing to file will have in pushing the judge in the other direction and making her hostile to the group’s position. The net of group influence could be overestimated if the failure to file is assumed to represent a case of no group influence rather than of a negative impact.

We now analyze a world consistent with the view that briefs are purely costly signals. Assume that the information in briefs is never critically read and assessed by the judge or her surrogates.

Remark 3. If the information in briefs is never read, \( p_1 \to 0 \), then \( v_1(0) = v_1(1) \to 0 \).

Strikingly, results based on assuming that amicus briefs are exclusively signals of support are drastically different from those assuming that they are informational tools. Not surprisingly, with no information verification the group’s filing never convinces the judge about germane legal and technical questions. Put differently, everything found with verification breaks down when there is no chance of verification.

Finally, if reality lies somewhere in between complete verification and pure signaling, with briefs sometimes being read and verified and at other times merely examined casually, proposition 1 demonstrates that group behavior is richer. The act of filing is now no longer perfectly informative and the group sometimes files in an unfavorable state.

4 Results & Discussion

Having established the existence of an equilibrium with intuitive behavior, we turn to analyzing our model’s implications. In this section, we present results drawn from the full model with \( N \) groups. Relative to the one group case, behavior is complicated by the strategic incentives created by informational competition between groups. Our results cut through this complexity to highlight the forces that shape filing decisions and their impact on judicial decision-making. In particular, we demonstrate a series of results tying the primitives of our model to variations in real world circumstances such as judicial
quality, group ideology, the quality of information available to filers, and variance in public opinion.

4.1 Judicial Heterogeneity

To begin, consider heterogeneity in judicial ability and quality. As noted in the previous section, filing a brief may convey information through dual channels. First, the judge can draw some information via the strategic signal sent by there simply being a filing. Yet, the judge is also a sophisticated consumer, and may be able to learn from the claims and data provided in the filing. Reflecting this, our amicus model incorporates the possibility that useful facts and ideas contained in briefs may be extracted by judges and their clerks.

However, not all judges are equals. In the real world judges vary widely in ability (see, e.g., Choi and Gulati (2004)), and this variance in acumen may vary considerably across substantive areas as well (e.g., Syzmer and Ginn (2014)). Such discrepancies should, presumably, map into judicial discernment of useful facts from a filing. In turn, variation in the adeptness to garner insights from a filing might influence outcomes. Since such differences will condition group expectations over the impacts of their filings, groups should be expected to adjust their behaviors. Further, as we shall see later, how influential the individuals’ preferences are over the eventual outcome will be influenced. The following proposition addresses these issues by clarifying the relationship between information extraction and group filing strategies.

Proposition 2. (Probability of information extraction)

1. Assume group \( i \) is biased. There exists an equilibrium in which as \( p_i \to 0 \), \( |\bar{c}_i(1) - \bar{c}_i(0)| \to 0 \). Thus, for \( p_i \) sufficiently small the difference between \( \bar{c}_i(1) \) and \( \bar{c}_i(0) \) is decreasing as \( p_i \) decreases. Furthermore, in this equilibrium as \( p_i \to 0 \), both \( \bar{c}_i(1) \to 0 \) and \( \bar{c}_i(0) \to 0 \).

2. There exists \( \bar{p}_i < 1 \) such that if \( p_i > \bar{p}_i \) then \( \bar{c}_i(s_i \neq \delta_i) = 0 \). Thus, for \( p_i \) sufficiently large \( \bar{c}_i(s_i \neq \delta_i) \) is decreasing in \( p_i \).

3. Fix a cut-point equilibrium \( \sigma \) and let \( p = (p^M, p^B) \) be the vector of extraction probabilities, where \( p^M \) is the set of \( p_i \) for the moderate groups and \( p^B \) is the set of \( p_i \) for the biased groups. Holding \( p^B \) constant, the assessment \( \sigma \) is still a cut-point equilibrium for any \( \tilde{p}^M \neq p^M \).

Proposition 2 demonstrates that a judge’s ability to extract factual information from the contents of a brief significantly impacts filing decisions. First, when the extraction
probability is very low, a group’s decision whether to file depends little upon its observed signal. In the limit, groups adopt the same filing decision rule whatever signal they receive. Consequently, in this case the judge can infer very little from the strategic behavior of the groups. In contrast, when the judge is very likely to read thoroughly the brief or extract a filing’s factual content, groups are very unlikely to file a brief without observing a favorable signal. Relative to a low extraction world, in this situation a judge can glean more information from the filing even if she does not verify: A sufficient extraction threat is enough to encourage “good” filing behavior. Similarly, a group that would be expected to file failing to produce a brief informs the judge, although the judge cannot definitively discern the group’s signal because she does not know the group’s filing costs. At an intermediate judicial competence level we expect to see a group conditioning its behavior on both its signal and cost, sometimes producing a brief with a bad signal and at other times not writing. Accordingly, in this intermediate range the judge’s ability to infer the content of a filing from a group’s strategies is imprecise, but informative.

Interestingly, if perhaps not shockingly, our results imply that making it easier for judges to discern facts will encourage more informative filing behavior. For example, they suggest that implementing standards for what constitute amicus "facts" are worthwhile. Doing so would be broadly consistent with the advocacy in Larsen (2014) for adopting measures that increase the methodological transparency of filings containing data as a means of reducing the ambiguity of the information contained in many briefs. Still, our results also suggest that a targeted approach is necessary, as made clearer by the following remark, which follows readily from the third component of Proposition 2.

**Remark 4.** Assume the judge can expend resources to increase the probability of extracting information from a brief. The judge only expends resources on briefs filed by biased groups.

Although our analysis focuses on aspects of $p_i$, such as judicial expertise, which are mostly fixed at the time of filing, there may be some components of $p_i$ that the judge can influence. While a full exploration of endogenous extraction is beyond the scope of our paper, remark 4 provides some insight into how the judge would want to allocate available resources. While our results suggest that increased transparency can encourage more informative filing behavior, this effect is not uniform across groups. Rather, only the behavior of biased groups is influenced by increased transparency in our setting. Thus, as highlighted by the above remark, resources spent on increasing transparency should target biased groups. The logic behind this result is straightforward. Since moderate groups already exhibit highly informative filing behavior, the marginal benefit of a dollar spent
on increasing transparency standards is much higher for biased groups. Transparency can
discipline these latter groups into using more informative filing strategies.

Interestingly, in our setting this discipline comes through both direct and indirect
channels that stem from two benefits of policies that encourage judicial ability to assess
claims. Intuitively, increasing judicial expertise (or making briefs more transparent) has
the direct effect of boosting the amount of information that can be garnered from a filing.
More nuanced, a potentially beneficial second-order effect involves impacting who files.
Policies increasing the expertise of the judge or her staff will discourage groups receiving
unfavorable signals from filing in the first place. This will increase the abilities of judges
to infer groups’ signals with very high precision even if they do not extract a brief’s
factual content.

Thus, as the next proposition indicates, in this case a high extraction threat can induce
filing behavior that provides judges with more information than if extraction is considered
unlikely. This occurs even if no actual extraction occurs.

**Proposition 3.** If information is always extracted and every group observes the state \( \omega \) then groups whose bias does not match the state will never file in equilibrium.

Note that Proposition 3’s implication that if amicus brief information is always read
and understood and most groups draw information from similar sources then filings should
be lopsided in favor of one side might be grounds for skepticism. The force driving this
expectation is that if information is usually learned by the judge then, from proposition
2, a group files no brief if its signal about the state implies a court ruling contrary to
its preferred decision. If all groups observe the signal about the state (or have highly
correlated information) this leads to no group with \( \delta_i \neq \omega \) ever filing an amicus brief.

But, of course, empirically briefs are frequently filed on both sides of an issue. However,
rather than merely being inconsistent with what we observe in the real world, this
discrepancy between competing sides filing and the result above highlights the potential
pathways delineated in our model by which competing groups can be induced to
file. Specifically, the lopsidedness result in our proposition can be broken by groups ei-
ther having different information or low expectations regarding the likelihood of judicial
extraction. If information is extracted but groups observe contrasting data because of
different sources then they will disagree about the state of the world and we can expect
briefs filed on each side. Given the judge extracts and verifies information, she arbitrates
who is right. Alternatively, if the extraction probability is not too high, a group with
a bad signal from its perspective will still be incentivized to file. Even groups having
identical information will file after observing unfavorable information, with those having
something to lose from an informed judicial decision hoping the brief is not critically assessed.

4.2 Group Heterogeneity

Having examined the implications of judicial heterogeneity, we now turn to the ramifications of groups varying qualitatively. Perhaps the most notable difference among organizations that are likely to have the resources to file a viable brief with hard information is their ideology or bias. Intuitively, this should condition how judges view what such groups submit (although, in our model, this can only matter if the brief’s information is not extracted), the likelihood of groups filing, and the type of information that different groups are likely to include in a brief. Relatedly, the importance of the issue or how much value placed on the judge’s decision may vary depending on the group. Also, a group’s information quality may vary, for instance due to a group’s access to relevant data (e.g., those writing briefs for firms may become privy to information not typically available to others) or due to their resources or latent ability. The following proposition addresses considerations of ideology and bias, the next analyzes variation in the stakes of the issue, and the third studies differences in information quality.

Proposition 4. (Group ideology and bias)

1. When group i is moderate it files in favor of its signal, given it files a brief.

2. When group i is biased in favor of outcome d it files in favor of decision d, given it files a brief.

Proposition 4 captures an important distinction between moderate and biased groups with regards to the informativeness of their filings. When moderate groups file a brief they support the decision that corresponds to their signal. Thus, the judge is able to infer that the group has factual information that supports the decision endorsed by the brief, without having to actually carefully consider the arguments provided in the brief. On the other hand, briefs filed by biased groups support the same decision regardless of their factual information. Thus, the judge is unable to discern perfectly whether or not the brief provides hard information that supports the position advocated by the brief without going through and extracting the information in the brief. In this sense, briefs provided by moderate groups are more informative than those provided by biased groups.17

17 Technically, there could exist cut-point equilibria in which the biased groups “babble” by mixing over
Proposition 5. *(Stakes of the issue)*

1. If \( v_i(d|\omega) \to 0 \), for all \( d \in \{d_0, d_1\} \) and \( \omega \in \{0,1\} \), then in every cut-point equilibrium \( \tau_i(s_i) \to 0 \) for all \( s_i \in \{0,1\} \).

2. If \( v_i(d|\omega) \to \infty \) then \( \tau_i(s_i = \omega) \to \infty \).

Proposition 5 demonstrates several key features of the relationship between a group’s value for the specific issue at hand and the probability of filing. First, and quite intuitively, as groups become relatively indifferent between rulings or the ruling is not salient to the group, they become very unlikely to file no matter what signal they receive about the state of the world. Substantively, this means that moderate groups, with moderation measured relative to the alternatives under consideration, are very unlikely to file. On the other hand, and again intuitively, groups with very high value for having their preferred policy implemented should be much more likely to file. Thus, a high level of ideological polarization that corresponds to a high number of biased groups with intense preferences over judicial decisions should be accompanied by a high filing level.

Our findings above may at least partially explain the steady, well-documented, increase in the number of filings over time. With the American polity becoming more polarized, groups with the wherewithal to file are also certainly more polarized, inducing them to file more briefs according to our model, *ceteris paribus*.

As mentioned, groups differ by more than merely their place in the relevant ideological distribution or how much value they place on the decision. Some may have access to better information of the type relevant for judicial decision-makers relative to others. In our model, this translates into the probability that the group’s signal matches the state of the world. The next proposition tells us what happens as the quality of this information declines.

Proposition 6. *(Quality of group information)*

If \( \pi_i \to 1/2 \) then \( \tau_i(1) = \tau_i(0) = 0 \). Thus, for \( \pi_i \) sufficiently small both cut-points are decreasing as \( \pi_i \) decreases.

Proposition 6 suggests that the ability to obtain useful information is a prerequisite for filing. In particular, as groups become very unlikely to learn the state of the world (as which side they support or in which they always file in favor of their least preferred decision. However, the important feature of common to all these equilibria is that the judge never changes her belief about a biased group’s signal based solely on the side for which it states support. As equilibrium outcomes are not impacted, our results and discussion refer to the intuitive equilibria in which biased groups endorse their preferred decision.
\( \pi_i \to 1/2 \), the probability that they file goes to zero, no matter what signal they have received. This is intuitive, as the quality of a group’s signal carries the relevant information in which the judge is interested. As the quality of this information deteriorates, a group’s ability to influence a judge, through either the strategic channel of filing behavior or through extracting a filing’s information, similarly wanes. In the extreme case where a group’s signal becomes completely uninformative, information cannot be transmitted to the judge through either channel, and consequently the group cannot influence the judge’s decision. Because filings are costly, groups unable to achieve influence will not file in the first place. We should only observe filings from groups that have some level of ability to provide the judge with some useful information on a case’s technical or legal elements.

Taken together, propositions 5 and 6 provide a framework for understanding the conditions under which a brief’s filing can influence judicial decision-making. Given that groups are free to file briefs whatever signal they receive, it is tempting to infer that briefs are unlikely to convey useful information. In contrast, even though group bias is fully known and judges may fail to extract the hard information contained in filings, the strategic nature of these decisions means that they may still convey useful information about the state of the world.

Our model also suggests an additional nuance with respect to the relationship between filing and information exchange. Because the judge infers information in these filings from the group’s strategic behavior, information transmission is conditioned by the known characteristics of the amici filers. Accordingly, an important takeaway from our analysis is that group identity and characteristics matter for judicial decision-making.

While the most basic form of this idea was articulated in earlier literature, our analysis provides an alternative logic. The former, in particular arguments made in support of the "affected groups" hypothesis of amici influence by filers, has emphasized that the influence of amicus briefs stems from a signal to the court regarding the breadth of interests that will be potentially affected by the decision. Hence, all relevant information contained in filings can be gleaned from the names of the organizations listed on the brief’s cover (Kearney and Merrill, 2000). The related hypothesis asserts that judges care about the impact of rulings on groups in society and that, therefore, the identities of interested parties provides the court with all requisite information.

By contrast, our model provides an alternative strategic logic for why all relevant information may be contained in the identity of the filers even though the judge’s utility does not directly depend upon the utility of these large groups.\(^{18}\) But as the germane

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\(^{18}\)This does not mean that our model fails to incorporate the flavor of the affected groups hypothesis.
information in the filings concerns the group’s private signal about the underlying state of the world, and the judge knows the group’s preferred policy and the value that it place on that policy, the judge can back out the group’s signal from the decision to file. Thus, only knowing the identity of the group and the group’s incentive, the judge forms a belief about the information the group possesses even if she does not independently extract it.

In this sense, all filings are not created equal. Rather, in our framework judges know that groups are biased, and that they may file briefs when their available information would point towards a ruling counter to their own interests. Even if a group has an incentive to file a brief and hope that its factual content remains undiscovered, since filing decisions are made strategically the offering of a brief provides useful information to the judiciary. Importantly, this implies that observing a group’s failure to file is also informative. Indeed, our model reveals a noteworthy wrinkle in the informational logic; the identity of groups that do not file briefs also conveys useful information to judges. In particular, in the cut-point equilibria described above, a group’s failure to file leads to a change in the judge’s beliefs. This is because each group’s decision rule about filing is conditioned by the group’s privately observed signal about the state of the world. Thus, when a group does not file, the judge believes that with some probability that this decision was made due to the group receiving a signal contrary to its preferred policy.

This alternative mechanism is particularly notable because it poses a challenge to empirical studies of amici influence. Since these studies typically collect data and perform analysis based on observed filings, an important part of the picture is missed. The strategic nature of a brief’s filing can result in sample selection issues that may lead to erroneous or overly confident conclusions. This critique is especially relevant when the empirical analysis is directed toward assessing the validity of a theory grounded in informational logic. For example, Box-Steffensmeier, Christenson and Hitt (2013) test a theory of heterogeneous influence by collecting data on observing filings and analyzing the network structure resulting from patterns of cosigning across briefs by groups. Key to the claims examined is assuming that if the number of filings on each side is roughly equal, the judge’s uncertainty about the relevant information discussed in the filings should not be moved in a manner favoring one option or another in making her decision. Our model suggests that this interpretation is problematic because the judge also garners information from non-filings. Thus, equal numbers of briefs on each side of a case will only translate into the judge placing equal weight on each state of the world existing if the number of non-

The judge’s utility for each policy is conditioned on the realization of \( \theta \), which can be conceptualized as the relative societal impact of one policy versus another. In this way, our model is consistent with the notion that judges place some direct weight on the preferences of impacted groups.
filers is also equivalent. If the number of non-filers is lopsided, she generally will have less
uncertainty about information and the state of the world and update accordingly. Not
considering this factor may explain otherwise difficult to rationalize empirical findings,
such as the finding of Box-Steinensmeier, Christenson and Hitt (2013) mentioned in the
introduction that suggests filed briefs could be counterproductive for groups. As such,
empirical studies assessing informational theories of amicus influence should account for
what might induce non-filing.

4.3 Public Influence

While our analysis has principally focused on the strategic behavior of groups given judi-
cial decision-making, we have built in a role for the broader public by incorporating the
ability of individuals to sign on to briefs. The influence of individuals on decisions in our
model may be interpreted as capturing public opinion’s direct or indirect incorporation
into judicial decision-making. For example, if judges are concerned with how rulings will
influence public welfare, public opinion as reflected by individual endorsements of briefs
may provide useful and influential information. However, as we will now discuss, such
impacts may be conditioned by the interaction of judicial bias and information, often in
ways that are quite subtle and where results dramatically vary.

Put differently, our model can provide theoretical insights into how public opinion
might influence judicial decisions in a way that rationalizes why there are contradictory,
competing, empirical findings regarding influence and its absence. Scholars interested in
the potential influence of public opinion on court rulings, especially those of the Supreme
Court, have reached conflicting empirical findings (e.g. Mishler and Sheehan (1993); Nor-
poth et al. (1994), for more recent discussions, see Hall (2014) and Owens and Wohlfarth
(2017)). Specifically, we show that under some conditions an increase in information
may correspond to an increase in individual influence, while increasing information may
result in reduced influence under other circumstances. Which effect dominates depends
upon the judge’s bias regarding the particular issue being decided. Without accounting
for the interaction of bias and information the influence of public opinion on judicial
decision-making is ambiguous.

To show how bias and information interact to condition public opinion’s impact, we
need to introduce some notation for the judge’s belief after observing any filings as a means
of providing a formal way of discussing a judge’s post-filing uncertainty. We can then
characterize the judge’s decision prior to observing public opinion, which we conceptualize
as the realization of the individuals’ preferences. Thus, let $\mu^J(o)$ denote the updated belief,
obtained via Bayes’ rule given strategy profile $\sigma$ and outcome profile $o$. Formally, $\mu^I_J(o)$ is defined as follows:

$$\mu^I_J(o) = Pr[\omega = 1|o, \sigma].$$

We now can now characterize the influence of the public by formally comparing the judge’s decision in the absence of knowledge about public opinion to the decision once public opinion is realized. Accordingly, we introduce notation to indicate these decisions. Let $\tilde{D}(\mu_J)$ denote the policy choice that maximizes the judge’s expected utility, given $\mu_J$. Formally,

$$\tilde{D}(\mu_J) = \max_{d \in \{0, 1\}} \int u_i(\mu_J, \theta)dF(\theta).$$

That is, $\tilde{D}(\mu_J)$ denotes the judge’s policy choice given her belief before she learns the precise nature of public opinion. Thus, we can think of $\tilde{D}(\mu^I_J)$ as the judge’s “interim” decision that she would make based only upon her belief upon observing filings, without knowing the individuals’ specific preferences over the issue at hand.

Let $\tilde{D}(\mu_J|\theta)$ denote the policy choice given belief $\mu_J$ and realization of the individuals’ preferences, $\theta$. Formally,

$$\tilde{D}(\mu_J|\theta) = \max_{d \in \{0, 1\}} u_i(\mu_J, \theta).$$

We can now define the influence of public opinion on the judge’s decision. We conceptualize this influence as how likely the realization of $\theta$, the preference of the individuals, changes the judge’s ruling from what she would have made prior to its observation. Accordingly, we define influence as follows:

**Definition 2.** The **influence** of public opinion on the judge’s decision is

$$Pr[\tilde{D}(\mu_J) \neq \tilde{D}(\mu_J|\theta)].$$

Substantively, this definition measures how likely the judge is to change her mind after observing public sentiment. If the judge’s decision before and after observing public opinion are likely to be the same, it is intuitive to conclude that the public has little sway over the choice. Conversely, if her opinion is very likely to change after observing public opinion, we conclude that public sentiment is highly influential.

With the necessary preliminaries established, we derive results on the conditions determining public opinion’s influence. The following proposition demonstrates that these conditions depend upon the judge’s bias over a given case, and that the relationship between uncertainty and public opinion is less clear-cut than intuition might lead one to
suspect.

**Proposition 7. (Influence of public opinion)**

1. There exists a unique $\bar{\mu}$ such that
   \[
   \int (u_1(\bar{\mu}, \theta) - u_0(\bar{\mu}, \theta))dF(\theta) = 0.
   \]

2. Furthermore, $\bar{\mu}$ is the unique value of $\mu$ that maximizes the influence of $\theta$.

3. If $\bar{\mu} = 0.5$ then influence is strictly increasing in $\text{Var}(\mu_I^s)$.

The results in proposition 7 underscore that there is no simple answer to the question of whether public opinion is influential for judicial decision-making. Rather, the relationship between public opinion and judicial decisions is highly conditional. Proposition 7 demonstrates that there always exists some belief for which the judge relies entirely on the realization of $\theta$ to make her decision. However, the specific value of this belief can vary wildly. Hence, the relationship between public opinion and judicial decisions may not always be strongly correlated. Only when the judge’s belief after observing the body of briefs is equal to a critical value which depends upon the judge’s ideological bias, $\bar{\mu}$, is the influence of public opinion most prevalent.

Our results also indicate a complicated relationship between a judge’s uncertainty over the underlying state of the world and public opinion’s influence. It is tempting to predict that, if a judge has a high degree of uncertainty over the correct state of the world, she will rely heavily on public opinion to inform her decision. However, our results demonstrate that this intuition only holds in a very specific setting. The third component of proposition 7 shows that the influence of public opinion is only monotonically related to uncertainty over the state of the world when $\mu = 0.5$, where this value is interpretable as indicating that the judge is not biased in favor of one ruling or another. Thus, this result can be substantively understood as telling us that the only situation where the influence of public opinion is clearly related positively to judicial uncertainty is when the judge is unbiased.

Similar to our results on the informational implications of non-filing for the empirical study of amicus influence, our theoretical findings that public opinion’s impact on the judge’s decision is highly variable presents a challenge for future empirical work. Proposition 7 has important implications for the empirical analysis of public opinion’s influence on
judicial rulings. Identifying the relationship between public opinion and judicial decisions empirically requires understanding the conditions under which the information contained in amicus filings and judicial ideology combine to create conditions favorable for public influence. Put starkly, our model suggests that the "best case" for observing public influence is when the pivotal judge is neutral and uncertainty over the state of the world after filings have been reviewed remains high. Accordingly, future empirical work should seek to account for these conditions. Only by integrating judicial bias, uncertainty, and their interaction can future studies convincingly answer the question of whether public opinion is influential for judicial decision-making.

5 Conclusion

Amicus briefs have risen greatly in prominence over the last decades. At least in the American context, such briefs not only allow various interested parties to comment but they bring types of arguments and data that are typically not part of the case mounted by plaintiffs or defendants.

However, while legal scholars have spent a great deal of time and effort discussing what has changed and what makes a successful brief, and empirical scholars have amassed and analyzed a great deal of data from a variety of perspectives, we have lacked a microfoundation of the underlying process. While our model is necessarily highly stylized, it offers a variety of insights into the role of briefs and and also potentially explains contradictory or head scratching empirical results. In doing so, it encapsulates the two prevailing views of briefs—as signals of preferences by actors with the resources and interests to involve themselves in a case and as a means of providing actual legal and technical information to judges as they strive to arrive at a decision—and shows that this distinction can be fundamental in inferring who should file, what the effect of a brief will be, and what possible role public opinion might perform.

In analyzing amicus choices and court decision-making we have shown that both judicial and filer heterogeneity have important consequences for when briefs are filed, and how much information they provide. In our model, not only does variation in judicial quality directly impact the amount of information extracted from briefs, it also has an important second-order effect through filers’ strategic incentives. When a judge is likely to extract the relevant technical information from a brief, groups are disciplined into filing only when they receive a favorable signal. As such, competent judges are able to draw tighter inferences about the information contained in a brief, even when they do not read
Filer heterogeneity is also an important part of the picture. While the most preferred policy of groups are known in our model, amicus filers may vary both in the value that they place on the issue at stake, as well as in the quality of information that they can provide. Both characteristics impact the decision to file, and the amount of information that is communicated. When groups are extreme in the sense that they value the issue highly, they become very likely to file. In contrast, groups valuing the issue modestly, or with little ideological bias in favor of one decision over the other, file infrequently. In regard to the differing competency of groups, groups with poor information are unlikely to file, as both the technical and strategic informational content of their filings carries little of note for the judiciary.

Our results highlight unacknowledged roadblocks for the empirical study of amicus influence. In particular, the informational logic of our model demonstrates that the decision not to file a brief provides judges with useful information. Thus, empirical studies on the impact of amicus briefs that only analyze observed filings may miss an important component of group influence.

Finally, our model indicates that the impact of public opinion on judicial decisions may be more nuanced than has previously been thought. A judge’s uncertainty, in our model after briefs are filed, and ideological bias should interact to condition how public opinion might influence any choices made. In particular, the public should be most influential when judicial bias is low and uncertainty about the correct ruling from a technical or legal standpoint remains high. Analogous to the examination of the influence of briefs on outcomes, without accounting for the impacts of, and the relationship between, uncertainty and judicial ideology, we cannot have faith in empirical assessments of public opinion’s influence on judicial decisions.

Our analysis also suggests avenues for future research. First, our model begins after a case has been placed on the docket. We consider this a useful abstraction, though future work may wish to analyze the impact of the cert or appeals process on the interaction that follows. Another interesting possibility would be to model explicitly the dynamics of the amicus process. In particular, while our analysis takes group quality as given, some groups (e.g., law firms wishing to develop a robust Supreme Court practice) may interact repeatedly with the court and wish to establish a reputation for providing useful information. A dynamic model that incorporates this force may provide insights for how group reputation and information provision develops over time. Finally, while the judge in our model does make decisions by inferring group’s signals when information is not
extracted, the judge does not choose to allocate time across briefs endogenously. A model incorporating this dynamic may reveal insights into how expectations of strategic judicial behavior may influence the initial decision to file a brief.
A Proofs

Group $i$’s expected utility for decision $d_1$ is $\mu v_i(d_1|1) + (1-\mu)v_i(d_1|0)$. On the other hand, its expected utility for decision $d_0$ is $\mu v_i(d_0|1) + (1-\mu)v_i(d_0|0)$. Thus, for a given belief $\mu$, comparing expected utilities yields that group $i$ prefers decision $d_1$ if

$$\mu > \frac{v_i(d_0|0) - v_i(d_1|0)}{v_i(d_1|1) - v_i(d_0|1) + v_i(d_0|0) - v_i(d_1|0)}. \quad (1)$$

Define $\beta_i(1) = v_1(1) - v_0(1)$ and $\beta_i(0) = v_0(0) - v_1(0)$. Thus, $\beta_i(\omega)$ gives the difference in utility to group $i$ for the decision matching the state over not matching. Additionally, $\beta(\omega)$ can be positive or negative depending on the preferences of the group. Using this, define the RHS of equation (1) as

$$\bar{\mu}_i = \frac{\beta_i(0)}{\beta_i(1) - \beta_i(0)}.$$

Let $\mu_i(s_i)$ be group $i$’s updated belief over $\omega$ following signal $s_i$. Thus,

$$\mu_i(s_i = 0) = \frac{(1 - \pi_i)q}{(1 - \pi_i)q + \pi_i(1 - q)},$$

$$\mu_i(s_i = 1) = \frac{\pi_iq}{\pi_iq + (1 - \pi_i)(1 - q)}.$$

Note that $\mu_i(s_i = 0) < \mu_i(s_i = 1)$. From equation (1) we see that group $i$ after observing its signal always prefers decision $d_1$ if

$$\mu_i(s_i = 0) > \bar{\mu}_i,$$

and we say that group $i$ is biased in favor of decision $d_1$. On the other hand, group $i$ after observing its signal always prefers decision $d_0$ if

$$\mu_i(s_i = 1) < \bar{\mu}_i,$$

and we say that group $i$ is biased in favor of decision $d_0$. Finally, the group’s preferred interim decision changes depending on its signal if

$$\mu(s_i = 0) \leq \bar{\mu}_i \leq \mu(s_i = 1),$$

and we say that group $i$ is moderate.
A.1 Existence and Characterization

We derive existence of cut-point equilibrium via a fixed point theorem. The crux of the proof is verifying continuity of a certain mapping representing groups’ indifference condition between filing and not filing.

Assume groups use cut-point strategies when deciding whether to file or not. Let $\tilde{o}$ be a realization of outcomes and $\tilde{o}_i$ be the outcome for group $i$ in realization $\tilde{o}$. Furthermore, let $\mathbb{I}(\tilde{o}_i = y)$ be an indicator function which takes a value of 1 if $\tilde{o}_i = y$ and 0 for $\tilde{o}_i \neq y$. Define the probability that $\omega = 1$ having observed any outcome $\tilde{o}_i$ from group $i$ is

$$P(\omega = 1|\tilde{o}_i) = \mathbb{I}(\tilde{o}_i = 1)P(\omega = 1|\tilde{o}_i = 1) + \mathbb{I}(\tilde{o}_i = 0)P(\omega = 1|\tilde{o}_i = 0) + \mathbb{I}(\tilde{o}_i = f)P(\omega = 1|\tilde{o}_i = f) + \mathbb{I}(\tilde{o}_i = n)P(\omega = 1|\tilde{o}_i = n).$$

Examining further, we can write each term as

$$P(\omega = 1|\tilde{o}_i = 1) = \pi_i$$
$$P(\omega = 1|\tilde{o}_i = 0) = 1 - \pi_i$$
$$P(\omega = 1|\tilde{o}_i = f) = \frac{q \left( \pi_i G(c \leq \tau_i(1)) + (1 - \pi_i) G(c \leq \tau_i(0)) \right)}{q \left( \pi_i G(c \leq \tau_i(1)) + (1 - \pi_i) G(c \leq \tau_i(0)) \right) + (1 - q) \left( \pi_i G(c \leq \tau_i(0)) + (1 - \pi_i) G(c \leq \tau_i(1)) \right)}$$
$$P(\omega = 1|\tilde{o}_i = n) = \frac{q \left( \pi_i G(c \leq \tau_i(1)) + (1 - \pi_i) G(c > \tau_i(0)) \right)}{q \left( \pi_i G(c > \tau_i(1)) + (1 - \pi_i) G(c > \tau_i(0)) \right) + (1 - q) \left( \pi_i G(c > \tau_i(0)) + (1 - \pi_i) G(c \leq \tau_i(1)) \right)}.$$

The judge’s belief following outcome $\tilde{o}$ is $\mu_J(\tilde{o}) = P(\omega = 1|\tilde{o})$. As groups’ signals are independent conditional on $\omega$ we can obtain $\mu_J(\tilde{o})$ by using the individual $P(\omega = 1|\tilde{o}_i)$ and sequentially updating. Thus, because $G_i$ is assumed to be continuous in $\tau_i$ the $P(\omega = 1|\tilde{o}_i)$ are continuous in $\tau_i$, and the resulting sequentially updated belief $\mu_J(\tilde{o})$ is continuous in $\tau_i$.

Let $P(d = \delta_i|\mu(o_i, o^k))$ be the probability that the judge’s decision matches group $i$’s preferred decision, given group $i$’s outcome is $o_i$ and $o^k$ is the $N - 1$ tuple of outcomes for the other groups. Using our analysis of the judge’s behavior, if $\delta_i = d_1$ this is the probability that $\theta > \tilde{\theta}_{\mu(o_i, o^k)}$, i.e. $1 - F(\tilde{\theta}_{\mu(o_i, o^k)})$. On the other hand, if $\delta_i = d_1$ this is
As $\mu_j$ is continuous in $\bar{c}$ and $\bar{\sigma}_\mu$ is continuous in $\mu$ since $H$ is assumed to be continuous we have that $P(d|\mu(o_i, o^k))$ is continuous in $\bar{c}$. After group $i$ observes signal $s_i$, using its expectation that other groups are using cut-point strategies $P(o^k|s_i)$ represents the probability of outcome $o^k$ given signal $s_i$. Again, because the distribution over costs is continuous $P(o^k|s_i)$ is continuous in $\bar{c}$.

For the next step, we introduce some notation. Let the probability that the judge implements decision $d_1$, after observing player $i$ offer filing $f_j$, and given outcome $o \in O_{-i}$ in strategy profile $\sigma$ as:

$$P_\sigma^o(f_j) = \left[p_iP(d = d_1|\mu(s_i, o)) + (1 - p_i)P(d = d_1|\mu(f_j, o))\right]$$

Define the expected utility for filing $f_j$ to group $i$ after observing signal $s_i$ as

$$U_i(f_j|s_i) = \sum_{o^k \in O_{-i}} \left[\mu_i(s_i)\left[v_i(d_1|1)P_\sigma^o(f_j) + v_i(d_0|1)(1 - P_\sigma^o(f_j))\right] + (1 - \mu_i(s_i))\left[v_i(d_1|0)P_\sigma^o(f_j) + v_i(d_0|0)(1 - P_\sigma^o(f_j))\right]\right]P(o^k|s_i) - c_i$$

Define the expected utility for not filing to group $i$ with preference $\delta_i$ after observing signal $s_i$ as

$$U_i(n|s_i) = \sum_{o^k \in O_{-i}} \left[\mu(s_i)\left[v_i(d_1|1)P(d = d_1|\mu(n, o^k)) + v_i(d_0|1)\left(1 - P(d = d_1|\mu(n, o^k))\right)\right]\right] + (1 - \mu(s_i))\left[v_i(d_1|0)P(d = d_1|\mu(n, o^k)) + v_i(d_0|0)\left(1 - P(d = d_1|\mu(n, o^k))\right)\right]\right]P(o^k|s_i)$$

To show that this equilibrium exists, define the vector-valued mapping

$$\psi = (\psi_1(c; 0), \psi_1(c; 1), ..., \psi_N(c; 0), \psi_N(c; 1)) : [0, C]^{2N} \to [0, C]^{2N}.$$  

Specifically, for group $i$ we define $\psi_i(c; s_i)$ as

$$\psi_i(c; s_i) = \max\{0, U_i(f|s_i) - U_i(n|s_i) + c_i\}.$$  

for all $i \in N$. If group $i$ is biased in favor of decision $d_j$ then $f = f_j$. On the other hand,
if group $i$ is moderate then $f = f_i$. 

As each $\psi_i$ is summing over components that are continuous in $\bar{c}$ we know that each component of the vector-valued mapping $\psi$ is continuous in $\bar{c}$, and thus $\psi$ is continuous in $c$. Since $[0,C]^2N$ is compact and convex Brouwer’s theorem yields a fixed point $\bar{c}^* = \psi(\bar{c}^*)$. By definition, each $\psi_i(\omega)$ is player $i$’s indifference condition between filing and not filing. As player $i$’s utility for filing is strictly decreasing in $c_i$, no actor will want to deviate from filing when $c_i \leq \bar{c}^*_i(\omega)$ and not filing when $c_i > \bar{c}^*_i(\omega)$. Thus, $\bar{c}^*$ is an equilibrium.

What remains to be checked is that each pairing $(\bar{c}^*_i(0), \bar{c}^*_i(1))$ is correctly ordered. Consider a group $i$ with preference $\delta_i = d_i$. In this case, we want that $\bar{c}_i(1) > \bar{c}_i(0)$. We prove this claim by contradiction. Assume that $\bar{c}_i(1) \leq \bar{c}_i(0)$. In this case, $\bar{\theta}_{\mu(f,o^k)} \geq \bar{\theta}_{\mu(n,o^k)}$. Then for $c \in (\bar{c}_i(1), \bar{c}_i(0))$ group $i$ could switch from filing in state 0 to not filing, which would save on filing costs and increase the probability that its preferred decision is made. Thus, $i$ has a profitable deviation which contradicts that $\bar{c}^*$ is an equilibrium.

### A.2 One Group Example

First, we characterize the judge’s behavior. For any belief $\mu$ there exists $\bar{\theta}_\mu$.

If the judge observes $s = 1$ then $\mu_J(1) = \frac{\pi q}{\pi q + (1-\pi)(1-q)}$. If the judge observes $s = 0$ then $\mu_J(0) = \frac{\pi(1-q)}{\pi(1-q) + (1-\pi)q}$. Next, conjecturing a cut-point strategy by the group, if the judge only observes that the group files then

$$
\mu_J(f) = \frac{[\pi G(\bar{c}(1)) + (1-\pi)G(\bar{c}(0))]q}{[\pi G(\bar{c}(1)) + (1-\pi)G(\bar{c}(0))]q + [(1-\pi)G(\bar{c}(1)) + \pi G(\bar{c}(0))]q}.
$$

On the other hand, if the judge only observes that the group does not file then

$$
\mu_J(n) = \frac{[\pi(1-G(\bar{c}(1))) + (1-\pi)(1-G(\bar{c}(0)))q}{[\pi(1-G(\bar{c}(1))) + (1-\pi)(1-G(\bar{c}(0)))q + [(1-\pi)(1-G(\bar{c}(1))) + \pi(1-G(\bar{c}(0)))q]}.
$$

Assuming that costs are drawn uniformly over $[0,v]$ we can rewrite these beliefs as

$$
\mu_J(f) = \frac{[\pi\bar{c}(1) + (1-\pi)\bar{c}(0)]q}{[\pi\bar{c}(1) + (1-\pi)\bar{c}(0)]q + [(1-\pi)\bar{c}(1) + \pi\bar{c}(0)]q}, \quad \text{and}
$$

$$
\mu_J(n) = \frac{[\pi(1-\bar{c}(1)) + (1-\pi)(1-\bar{c}(0))]q}{[\pi(1-\bar{c}(1)) + (1-\pi)(1-\bar{c}(0))]q + [(1-\pi)(1-\bar{c}(1)) + \pi(1-\bar{c}(0))]q}.
$$

In this case, her utility for $d_1$ is $\mu + 1/2 + b$ and for $d_0$ is $3/2 - \mu$. Thus, she chooses $d_1$ if $\mu > \frac{1-b}{2}$. Otherwise, if the group files, for a given belief $\mu$ over the state of the world $\omega$, if the realization of $\theta$ is high then the judge selects $d_1$ and if the realization of $\theta$ is low then
the judge chooses \( d_0 \). Specifically, there exists a realization of individual preferences, \( \bar{\theta}_\mu \), at which the judge is indifferent between the two decisions. Setting \( u_1(\mu, \theta) = u_0(\mu, \theta) \) and solving we get \( \bar{\theta}_\mu = 1 - \mu - \frac{b}{2} \). If the group observes \( s = 1 \) its expected utility for filing is

\[
pPr(\theta > \bar{\theta}_\mu(1))v + (1 - p)Pr(\theta > \bar{\theta}_\mu(f))v - c = v[p\mu(1) + (1 - p)\mu(f)] - c.
\]

On the other hand, if the group does not file then its expected utility is

\[
Pr(\theta > \bar{\theta}_\mu(n))v = v\mu(n).
\]

Thus, if \( s = 1 \) the group is indifferent between filing and not filing at

\[
c(1) = v[p\mu(1) + (1 - p)\mu(f) - \mu(n)].
\]

If the group observes \( s = 0 \) its expected utility for filing is

\[
pPr(\theta > \bar{\theta}_\mu(0))v + (1 - p)Pr(\theta > \bar{\theta}_\mu(f))v - c = v[p\mu(0) + (1 - p)\mu(f)] - c.
\]

On the other hand, when \( s = 0 \) if the group does not file then its expected utility is

\[
Pr(\theta > \bar{\theta}_\mu(n))v = v\mu(n).
\]

Thus, if \( s = 0 \) the group is indifferent between filing and not filing at

\[
c(0) = v[p\mu(0) + (1 - p)\mu(f) - \mu(n)].
\]
Therefore, the group’s indifference conditions are given by

\[ c(1) = v[p\mu(1) + (1 - p)\mu(f) - \mu(n)], \text{ and} \]
\[ c(0) = v[p\mu(0) + (1 - p)\mu(f) - \mu(n)]. \]

Of course, in equilibrium, the cut-point determining the group’s decision to file must be consistent with the judge’s belief about the cut-point. Thus, equilibrium cut-points are given by \( \bar{c}^* = (\bar{c}^*(1), \bar{c}^*(0)) \) solving

\[ \bar{c}^*(1) = \max\{0, v[p\mu(1) + (1 - p)\mu(f|\bar{c}^*) - \mu(n|\bar{c}^*)]\}, \text{ and} \]
\[ \bar{c}^*(0) = \max\{0, v[p\mu(0) + (1 - p)\mu(f|\bar{c}^*) - \mu(n|\bar{c}^*)]\}, \]

where the existence of the cut-points follows from Brouwer’s theorem.

If \( p_1 = 1 \) then \( \bar{c}(0) = 0 \) and we can solve to find a unique solution for \( \bar{c}(1) \) given by

\[ \bar{c}(1) = \frac{\pi q v}{1 + 2\pi q - p - q}. \]

Straightforward differentiation and signing the result yields the statements of remark 2.

For remark 1 note that if the group does not file following either signal then the judge chooses \( d = d_1 \). Resulting in the group’s highest possible payoff. Furthermore, this is optimal for the judge as she retains her prior following no filing and chooses \( d = d_1 \) for \( \mu > 1/2 \).

For remark 3 assume \( p_1 = 0 \). As the judge does not ever extract the information from the group’s brief and there are no other filings, if the group has an incentive to file following one signal she will have the same incentive following the other signal. Thus, it must be that \( \bar{c}_1(0) = \bar{c}_1(1) \). Due to this, the judge never updates about the group’s information after observing a filing and so there cannot be an equilibrium in which the group files. Thus, the group never filing is an equilibrium if (as \( p_i \) is not \( > 0 \)) off the path of play the judge chooses \( d = d_0 \) if it observes a filing.
A.3 Results

Proof of Proposition 2. Let group $i$ be biased in favor of outcome $\delta_i$. The difference in cut-points for group $i$ is given by

$$\left| \bar{c}_i^*(1) - \bar{c}_i^*(0) \right| = \left| [U_i(f_{\delta_i}|s_1 = 1) - U_i(n|s_i = 1)] - [U_i(f_{\delta_i}|s_i = 0) - U_i(n|s_i = 0)] \right|. \quad (2)$$

We show that an equilibrium exists in which $|\bar{c}_i^*(1) - \bar{c}_i^*(0)| = 0$. First, rewrite equation (2) as

$$\left| [U_i(f_{\delta_i}|s_1 = 1) - U_i(f_{\delta_i}|s_i = 0)] - [U_i(n|s_i = 0) - U_i(n|s_i = 1)] \right|. \quad (3)$$

Assume the judge and groups $-i$ conjecture that the cut-points used by group $i$ are such that $|\hat{c}_i(1) - \hat{c}_i(0)| = 0$. In this case, the judge’s belief over $\omega$ is the same, regardless if group $i$ files or not. Furthermore, the other groups expect that group $i$’s decision has no influence over outcomes. Therefore, the actions of the other players and thus outcomes, are independent of group $i$’s decision. Consequently, group $i$’s utility for filing is the same regardless of its signal and so the left term in brackets in equation (3) is 0. Similarly, the utility to the group for not filing is the same following either signal. As such, equation (3) is equal to 0 and so, consistent with the judge’s and other groups’ conjecture, group $i$’s decision to file or not is independent of its signal. Hence, it is an equilibrium. Furthermore, in such an equilibrium because group $i$ does not influence outcomes it can never be optimal to pay any positive cost $c_i$ to file. Thus, it must be that $\bar{c}_i(1) = \bar{c}_i(0) = 0$. Because at $p_i = 0$ there exists such an equilibrium, upper hemicontinuity ensures that as $p_i \to 0$, there exist a sequence of equilibria in which $|\bar{c}_1(0) - \bar{c}_1(1)| \to 0$. Furthermore, as $p_i \to 0$, both $\tau_1(1) \to 0$ and $\tau_1(0) \to 0$.

To show the second part of the proposition, continue assuming $\delta_i = 1$ and let $p_i = 1$. In this case,

$$\tau_i(0) = \sum_{o^k \in O} v_i \left[ P\left(d = \delta_i|\mu(s_i, o^k)\right) - P\left(d = \delta_i|\mu(n, o^k)\right) \right] P(o^k|s_i = 0).$$

Following any action by the group the judge’s belief cannot shift by more than it would had she actually observed the group’s action. Thus, $P\left(d = \delta_i|\mu(s_i, o^k)\right) - P\left(d = \delta_i|\mu(n, o^k)\right) \leq 0$. Because the group’s gain following any outcome is never positive it
must be that at \( p_i = 1 \) we have \( \bar{c}_i(0) = 0 \). As everything is continuous in \( p_i \), \( p_i \) exists as stated.

Next, suppose that group \( i \) is biased in favor of \( d_1 \), and that \( p_i = 1 \). To establish that \( \bar{c}_i(0) = 0 \), it suffices to show that \( U_i(f_1|0) - U_i(n|0) \leq 0 \). First, note that rearranging and simplifying the inequality \( U_i(f_1|0) - U_i(n|0) < 0 \) yields

\[
\sum_{o^k \in O_{-i}} \left[ \mu(0) \left( v_i(d_1|1) - v_i(d_0|1) \right) \left( P(d = d_1|\mu(0,o^k)) - P(d = d_1|\mu(n,o^k)) \right) \right] + \left[ (1 - \mu(0)) \left( v_i(d_1|0) - v_i(d_0|0) \right) \left( P(d = d_1|\mu(0,o^k)) - P(d = d_1|\mu(n,o^k)) \right) \right] P(o^k|0).
\]

To show that this quantity is less than or equal to 0, first note that because revealing no signal is always weakly less informative than revealing a signal, as occurs whenever a filing is made when \( p_i = 1 \), it must be that \( P(d = d_1|\mu(0,o^k)) - P(d = d_1|\mu(n,o^k)) < 0 \).

From this, it follows that each term in the summation above is weakly negative as long as

\[
\mu(0)(v_i(d_1|1) - v_i(d_0|1)) > (1 - \mu(0))(v_i(d_1|0) - v_i(d_0|0)),
\]

which implies

\[
\mu(0) > \frac{(v_i(d_1|1) - v_i(d_0|1))}{(v_i(d_1|1) - v_i(d_0|1)) - (v_i(d_1|0) - v_i(d_0|0))}.
\]

Note that this is satisfied, as we have assumed that player \( i \) is biased in favor of decision \( d_1 \). An analogous argument establishes the result when player \( i \) is biased in favor of decision \( d_0 \).

Finally, to establish the third component of the proposition, consider a cutpoint filing equilibrium assessment \( \sigma \). In any such equilibrium, note that the judge is able to perfectly infer the signal observed by each moderate group, conditional on observing the moderate group file. This implies that, for a moderate group \( i \), the probability that the judge implements decision \( d_j \), after observing the signal of group \( i \) is equal to the probability that the judge implements decision \( d_j \) after observing the group file in favor of decision \( d_k \) for every outcome \( o \). Formally, we write this as

\[
P(d = d_j|\mu(0,o)) - P(d = d_j|\mu(f_k,o)). \tag{4}
\]
Furthermore, note that the condition required for a group to be considered moderate is not a function of $p_i$. Now, consider a vector of extraction probabilities $p = (p^M, p^B)$, where $p^M$ are the probabilities assigned to the moderate groups and $p^B$ are the probabilities assigned to the biased groups. Denote another vector of extraction probabilities $p' = (p'^M, p'^B)$, which only differs in the extraction probabilities of the moderate groups. Finally, let $U_i(a|\sigma,p)$ be player $i$’s utility for action $a$ in assessment $\sigma$ given extraction probabilities $p$. Taken together, equation 4 and the fact that moderation is not a function of $p_i$ implies that for every $p$ and $p'$,

$$U_i(a_i|\sigma,p) = U_i(a_i|\sigma,p')$$

for all players $i$, actions $a$. Therefore, if $\sigma$ is an equilibrium assessment under $p$, it is an equilibrium assessment under $p'$.

**Proof of Proposition 3.** Suppose $p_i = 1$ for all $i$ and that all groups receive the same signal, $s_i = \omega$. We show that filing when $\delta_i \neq \omega$ is strictly dominated by not filing. Without loss of generality, suppose that $\delta_i = 1$ and $\omega = 0$. First, note that because $p_i = 1$, it follows that $\mu_J(n,o^k) > \mu_J(f,0^k)$ for all outcomes $o^k$. Therefore, $P(d_i = 1|\mu_J(n,o^k)) < P(d_i = 1|\mu_J(f,o^k))$ for all $o^k$. This, combined with the fact that filing is costly, it follows that filing when $\omega \neq \delta_i$ is strictly dominated, and so no group will file in equilibrium when $\delta_i \neq \omega$.

**Proof of Proposition 5.** First, we show that as $v_i \to 0$, $\bar{c}_i(d) \to 0$. To deduce a contradiction, let $v_i = 0$ and suppose that $\bar{c}_i(d) > 0$. In this case, in equilibrium

$$\sum_{o^k \in \mathcal{O}_{-i}} v_i \left[ p_i P\left( d = \delta_i|\mu(s_i,o^k) \right) + (1 - p_i) P\left( d = \delta_i|\mu(f,o^k) \right) - P\left( d = \delta_i|\mu(n,o^k) \right) \right] P\left( o^k|s_i \right) > 0,$$

which contradicts $v_i = 0$. Continuity in $v_i$ establishes the result.

Next, we study the case where $v_i \to \infty$. To maintain the model’s assumptions this implies that the support of $G_i$ is going to $[0,\infty)$. The difference between the cut-points
is given by
\[ \bar{c}_i^*(1) - \bar{c}_i^*(0) = \sum_{o^k \in O} v_i \left[ (1 - p_i)Pr(\theta > \bar{\theta}_{f,o^k}) - Pr(\theta > \bar{\theta}_{n,o^k}) \left( Pr(o^k|s = 1) - Pr(o^k|s = 0) \right) 
+ p_i \left( Pr(o^k|s = 1)Pr(\theta > \bar{\theta}_{\mu(1,o^k)}) - Pr(o^k|s = 0)Pr(\theta > \bar{\theta}_{\mu(0,o^k)}) \right) \right]. \] (5)

From existence and characterization proposition we have \( \bar{c}_i^*(1) > \bar{c}_i^*(0) \) and so
\[ (1 - p_i)Pr(\theta > \bar{\theta}_{f,o^k}) - Pr(\theta > \bar{\theta}_{n,o^k}) \left( Pr(o^k|s = 1) - Pr(o^k|s = 0) \right) + p_i \left( Pr(o^k|s = 1)Pr(\theta > \bar{\theta}_{\mu(1,o^k)}) - Pr(o^k|s = 0)Pr(\theta > \bar{\theta}_{\mu(0,o^k)}) \right) > 0. \]

Thus, as \( v_i \to \infty \) we have \( \bar{c}_i^*(1) - \bar{c}_i^*(0) \to \infty \) and, hence, the difference between the cut-points becomes arbitrarily large. Furthermore, as the cut-points are bounded below this implies that \( \bar{c}_i^*(1) \to \infty \) and \( \bar{c}_i^*(0) \) is finite. Note, that the bound \( \bar{v} \) must be going to infinity at a rate faster than 1, whereas in \( \bar{c}_i^*(1) - \bar{c}_i^*(0) \) the \( v_i \) is multiplied by a term that is a probability and, thus, \( \bar{c}_i^*(1) \) is going to infinity at a rate less than 1 and so we do not have to worry about it hitting the upper bound.

**Proof of Proposition 6.** Recall that in equilibrium
\[ \sum_{o^k \in O_{-i}} v_i \left[ p_i Pr(d = \delta_i|\mu(s, o^k)) + (1 - p_i) Pr(d = \delta_i|\mu(f, o^k)) - Pr(d = \delta_i|\mu(n, o^k)) \right] P(o^k|s_i) = \bar{c}_i(s_i). \] (6)

Now, suppose that \( \pi_i = 1/2 \). Note that when \( \pi_i = 1/2 \), \( s_i \) carries no information about \( w \). This implies that for every pair of outcomes for player \( i \ a_i, o'_i \), and every profile of outcomes for the other players \( o_{-i} \),
\[ \mu(a_i, o_{-i}) = \mu(o'_i, o_{-i}). \]

This implies that for every pair of outcomes for player \( i \ a_i, o'_i \), and for every profile of outcomes for the other players \( o_{-i} \),
\[ Pr(d = \delta_i|\mu(a_i, o_{-i})) - Pr(d = \delta_i|\mu(o'_i, o_{-i})). \]
From this, it follows that the left hand side of equation 6 is equal to 0, which establishes the result.

The following Lemma is useful for establishing the results on individual influence that follow.

**Lemma 1.** $\bar{\theta}$ is decreasing in $\mu$.

**Proof.** Recall that $\bar{\theta}$ is such that

$$u_1(\mu, \bar{\theta}) - u_0(\mu, \bar{\theta}) = 0.$$  

Viewing $\bar{\theta}$ as an implicit function of $\mu$, application of the implicit function theorem yields

$$\frac{\partial \bar{\theta}}{\partial \mu} = -\left[ \frac{\partial u_1}{\partial \mu} - \frac{\partial u_0}{\partial \mu} \right] \frac{\partial \bar{\theta}}{\partial \bar{\theta}} < 0.$$  

\[\square\]

**Proof of Proposition 7** First, note that because $u_1(\mu, \theta)$ is increasing in $\mu$ and $u_0$ is decreasing in $\mu$,

$$u_1(\mu, \theta) - u_0(\mu, \theta).$$

is increasing in $\mu$. Thus, for any distribution $F(\theta)$, there exists a unique $\mu$ such that

$$\int u_1(\mu, \theta) - u_1(\mu, \theta)dF(\theta) = 0.$$  

Note that for all $\mu > \bar{\mu}$, $\tilde{D}(\mu) = 1$, and that $\tilde{D}(\mu) = 0$ otherwise.

Next, we will show that $\bar{\mu}$ is the unique value of $\mu$ that maximizes the influence of $\theta$. To show this, it suffices to show that influence is strictly increasing in $\mu$ for all $\mu < \bar{\mu}$ and decreasing for all $\mu > \bar{\mu}$.

First, consider some $\mu^l < \bar{\mu}$. Note that at $\mu$, $\tilde{D}(\mu^l) = 0$. Additionally, let $\bar{\theta}$ be the unique value of $\theta$ such that $u(\mu^l, \bar{\theta}) = u_0(\mu^l, \bar{\theta})$. In this case, influence is the probability that the judge selects policy 1. This probability is $1 - F(\bar{\theta})$. By Lemma 1, $\bar{\theta}$ is decreasing in $\mu$. This implies that at $\mu^l$, $1 - F(\bar{\theta})$ is increasing in $\mu$.

Next, consider some $\mu^l > \bar{\mu}$. Note that at $\mu$, $\tilde{D}(\mu^l) = 1$. Additionally, let $\bar{\theta}$ be the unique value of $\theta$ such that $u(\mu^l, \bar{\theta}) = u_0(\mu^l, \bar{\theta})$. In this case, influence is the probability
that the judge selects policy. This probability is \( F(\bar{\theta}) \). By Lemma 1, \( \bar{\theta} \) is decreasing in \( \mu \). This implies that at \( \mu^I \), \( F(\bar{\theta}) \) is decreasing in \( \mu \).

Finally, the fact that influence is strictly increasing in \( \text{Var}(\mu^I_J) \) when \( \bar{\mu} = 0.5 \) follows from the definition of influence.

References


