The Amicus Game

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Abstract

Despite increased scholarly attention towards analyzing the influence of amicus briefs on case outcomes, 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 advocate for a particular ruling and may provide information to influence a judge's decision. We show that group influence depends upon the interaction of the potential filer's bias and contextual factors. In particular, while the influence of biased groups is sensitive to features of each case, such as the stakes of the issue, moderate group influence is relatively stable. Additional conditional impacts are demonstrated if judges can strategically decide which briefs to read. Our findings are extremely relevant empirically, as they indicate that previous analyses of influence with observational data are likely undermined by difficult to justify assumptions. Notably, analyzing only filed briefs will generate results over- or under-estimating influence unless non-filers have no interest in cases' outcomes. Happily, our model offers relatively straightforward and theoretically-based solutions if this assumption is not tenable.

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.[1] 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)).[2] 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.[3]

How influential are these briefs for judicial decisionmaking, and what causes this influence to vary? Given the prominence of amicus briefs and their potential to inform the court, discerning the influence of briefs is crucial for understanding the amicus process and the role that outside groups play in shaping judicial outcomes. Accordingly, scholars have increasingly focused on the seeming impacts of amicus briefs and identifying the underlying processes at work. Descriptively, and not surprisingly given their rise in numbers, briefs are more likely than previously to be directly cited in opinions (e.g., Owens and Epstein (2005)) or to have their language lifted from them (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.)).

[1]Various reasons offered for this development include a dramatic rise in the count of interest groups, the Supreme Court docket's subsequent reduction, 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)).

[2]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 Supreme Court's use of amici is also very high relative to other nation-states (Collins Jr and McCarthy (2017)).

[3]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., Becker Kane (2017)).

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 their corresponding insights, what has been lacking are clear theoretical foundations for analyzing amicus brief influence. "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). Our analysis addresses this gap by developing a game-theoretic model of the amicus process. We show that a brief's influence depends highly on the filing group's motivations. It also provides a theoretically-based guidelines for improving empirical estimates of the influence of interest group briefs.

Hence, we offer the first attempt that we know of to build a microfounded theory of amicus behavior. In doing so, we need emphasize that our analysis focuses on briefs that are least potentially informative to the judge. Distinctions between potentially viable filings and those that are 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)) have received considerable scholarly attention and inform our modeling choices (e.g., Zuber, Sommer and Parent (2015); Larsen and Devins (2016); Solimine (2016)).[4] In our model we capture this concept of potentially viable briefs by stipulating that possible purveyors of amicus briefs who might sway a pivotal judge each decide whether to pay the cost of producing a brief and whether to include hard, verifiable, information that might be useful to the judicial decision-maker. Thus, while the group can write a brief without verifiable information, the important aspect of our model from both a conceptual and a strategic standpoint is that the group at least has access to such information and has the option of integrating it into a brief. Subsequently, the judge may or may not thoroughly read the information contained in each brief and decides the issue.

As indicated, we present three sets of results utilizing our framework that furnish theoretical insights and speak to empirical research on amicus influence. First, we show that the influence of briefs filed by groups with strong biases is sensitive to variation in the value that these filers place on the case at hand as well as differences in the judge's likelihood of carefully reading their briefs. Conversely, the influence of relatively moderate groups is less

[4] See Posner's decision in *Voices for Choices v. Ill. Bell Tel. Co.*, 339 F.3d 542 (7th Cir. 2003). We should note that we allow the attributes of potentially viable briefs to vary by analyzing the relative quality of the information to which groups have access.

sensitive to the value they place on the issue and, surprisingly, is not at all conditioned by variation in the judge's likelihood of reading their filings. This discrepancy highlights the importance of heterogeneity in the amicus process, as a group's influence may depend upon an interaction of contextual factors and ideological bias. In contrast to these ideologically-conditional effects of the stakes of the case to groups and judicial scrutiny, we show that the effects of variation in the quality of a group's information are similar for moderate and biased groups. Regardless of ideology, a group with low quality information has little influence.

Second, we draw out the implications of our theoretical results for empirical studies of amicus influence. Of special note is our model's highlighting of an important force that is unaccounted for in empirical studies of amicus behavior: That the *absence* of a filing by an interested group provides a judge with relevant information. This is rooted in the strategic nature of information in our model. When a group foregoes filing, a judge can draw an inference about its relevant information based on her knowledge of group characteristics. As such, our model points to an important selection effect in terms of when groups file. Groups will only file if they have a stake in the case, but a non-filing may be a function of either a lack of interest or a prohibitively high filing cost. Our model allows us to demonstrate formally how failing to account for the relevance of cases to a group will produce an inaccurate estimate of amicus influence. We provide a blueprint for future empirical research to implement—coding a variable accounting for whether each case is relevant to a group's interests.

Finally, we build additional realism into our analysis by extending our model to incorporate judicial auditing, by which the judge strategically decides whether to invest resources to assess a brief. In line with our baseline model results, strategic auditing differentially impacts moderate and biased groups. A judge's threat to verify a brief's factual content has little effect on the behavior or influence of moderate groups. Such groups already exhibit "good" filing behavior, as they do not attempt to mislead the court, so a judge's ability to audit is unnecessary for moderate group filings to convey information (although, of course, the judge may read the brief to gather the information). By contrast, biased groups only have influence when the judge can potentially read their filings, which in our extension means audit. Such groups will always attempt to mislead judges unless they face some threat that their briefs' factual contents (or lack thereof) are verified.

Overall, our analysis demonstrates that potential filers are strongly incentivized to consider a situation's context and what motivates judicial decision-makers and others who might file a brief. Therefore, the influence of amicus briefs on judicial decision-making is conditioned by these factors as well. Judges, on the one hand are frequently hungry for valuable information and, on the other hand, are well-aware that those pushing briefs have private interests that might conflict with their own predilections and attitudes. Motivations, information, and strategic choice behavior must all be incorporated for meaningful analysis of amicus choices and effects. Absent such integration, making full sense of what is observed empirically is problematic.

2 The Amicus Model

We now specify our amicus model in which strategic interests decide whether or not to file a brief designed to influence judicial decision-making. Our model is most related to those found in the persuasion games literature (Milgrom (1981), Milgrom and Roberts (1986)). In these models persuasion occurs by furnishing "hard information," by which we mean information where disagreement over the substance is difficult post-verification (Ijiri, 1975). In turn, the information provision structure is most similar to Emons and Fluet (2016), as our model follows this analysis by assuming that there are private information reporting costs, which breaks the unraveling result by which all information is revealed (Milgrom (1981)).

However, related persuasion models typically assume that the decision-maker always observes the information revealed by the sender. By contrast, while we assume that a brief may contain hard information, a filing does not automatically imply that the judge observes it. In our model, with some probability the brief is reviewed and the information is verified and with some probability the judge only observes that the group files a brief. These alternatives are consistent with different foci in the literature, one stressing a brief's factual content and another emphasizing the act of filing. Thus, a brief's filing serves as either a means to transmit hard information, with the judge learning the group's private information given that she audits the brief, or as a costly signal, so that the judge does not learn the group's information directly but draws inferences about it based on her understanding of strategic behavior but does not learn it directly.

In our amicus model the relevant actors are a judge and a set of N groups (in the real world such actors might not formally be groups, but entities such as law firms, loosely organized coalitions of legal experts, or corporations). Specifically, the judge makes a decision, $d \in \{d_0, d_1\}$, about an issue.[5] Each group potentially possesses the will and capacity to produce a high quality amicus brief designed to influence the judge's decision. Put differently, as in many proceedings, we assume that there are actors with vested interests besides the plaintiff

[5]Modeling the judge's decision as dichotomous is consistent with the approach taken in empirical work studying the influence of briefs, where a binary coded case decision or voting choice is the outcome of interest (e.g, Caldeira and Wright (1988), Kearney and Merrill (2000), Collins Jr (2008), Black and Boyd (2013), Box-Steffensmeier, Christenson and Hitt (2013); see Collins Jr, Corley and Hamner (2015) for an exception). We find qualitatively similar results to the dichotomous judicial choice setting if we allow the judge to author nuanced opinions by choosing any alternative between d_0 and d_1 and specify group preferences in a manner that is similar to the dichotomous model.

or defendant with the option to be part of the process to try and affect judicial outputs.

Consistent with conventional beliefs about what kinds of cases might induce an amicus filing, we assume that there are relevant technical or legal arguments that 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, assume that $\omega = 1$ with probability q and $\omega = 0$ with probability $1-q$. In general, we 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.[6] In the initial decision stage each group observes a private signal about ω, denoted $s_i \in \{0,1\}$. With probability $\pi_i > \max\{q, 1-q\}$ group i's signal is correct and with probability $1-\pi_i$ it is not.[7] This parameter captures heterogeneity in each group's expertise regarding the relevant issue-area.

After observing its signal, each group privately observes its own cost of filing a brief. Formally, given that producing a meaningful brief is costly, we assume that filing a brief costs c_i. Put differently, we conceptualize briefs as costly efforts principally driven by a desire to influence outcomes (e.g., Collins Jr (2008)).[8] Each group's cost is distributed according to the cdf $G_i(c_i)$ with associated pdf $g_i(c_i)$ and full support on the interval $[0, C]$. 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 have different capacities. Costs are private, as each group knows best its costs for brief writing and filing.[9]

[6] Although our model focuses on group influence on the court's final decision, we can reinterpret it as capturing the role of amicus briefs for convincing the Supreme Court whether to grant a writ of certiorari to hear a case. In this interpretation, groups differ on whether they want the Court to put the case on the docket, groups have private information relevant for whether the case should be heard, the judge's decision is whether to grant cert and, in doing so, weights the impact of the case on the public. Previous models studying the Supreme Court's decision to review a case abstract from the role of interests groups in this process (Cameron, Segal and Songer (2000), Lax (2003), Bustos and Jacobi (N.d.)).

[7] This assumption about π_i ensures that each group's signal is more accurate than the prior belief. See footnote 14 on how we can relax this assumption with minimal changes to our results.

[8] Writing and filing costs of an amicus brief were estimated at approximately 50 thousand dollars in 2004 (Lynch (2004)), which would be approaching 70 thousand 2018 dollars. Beyond monetary costs, a brief filing requires investing time and, consequently, incurring significant opportunity costs. Although organizational maintenance, self-promotion, or other symbolic considerations could play a role in some situations for some types of brief producers (Hansford, 2004), producing a brief still involves some expenditure of time and/or resources and these idiosyncrasies can be captured by the group specific distributions over costs. Finally, while we focus on uncertainty over the cost of filing, our model is isomorphic to one where a group's filing cost is known but its valuation of the issue at stake is private.

[9] 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 is redundant. Additionally, 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

Subsequently each group i chooses to file a brief in favor of decision d_0, file in favor of decision d_1, or not file. Denote group i's choice as $a_i \in \{f_0, f_1, n\}$. A group's filing choice may depend upon its signal, though we do not restrict this choice. If the group files it may choose to write a brief that, if read, reveals the group's signal to the judge. This corresponds to a brief that includes hard information relevant to the judge's decision, such as facts, data, or statistical analysis. On the other hand, the group may file a brief that lacks such factual information. A group is free to file in favor of either decision regardless of the signal that it receives. Thus, it is possible that a group will file in favor of one decision, but by not including unfavorable hard information lie by omission.[10] However, it cannot advocate a particular decision with its filing by manipulating the brief's factual content.[11]

After groups file, we advance to the judicial decision stage. Consistent with the demands on justices' (and their staffs') time, not all filed amicus briefs are read or thoroughly evaluated by the judge.[12] We capture judicial attention by assuming that if group i files then with probability p_i the judge reads the brief and learns the information contained within it. Conversely, with probability $1 - p_i$ the judge only observes that the group files and the decision the brief endorses but sees no information to which the group had access. As mentioned, we will extend our analysis to study how amicus brief influence is impacted if the judge can strategically choose which briefs to read.

Next, the judge experiences a shock to her utility given by ϵ drawn uniformly over $[-1, 1]$. This shock can represent any non-amicus related factors that affect the judge's considerations of the two decisions, e.g., favorable public opinion regarding the case making her more prone to be supportive. Finally, the judge rules by deciding between d_0 or d_1 and the game ends.

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. Thus, if the final decision matches the state then the judge gets a payoff of 1 and if it does not she

place. Thus, our assumption that costs are private as each group seems a reasonable approximation of the real world.

[10] For more on this, see Larsen (2014), who argues that, while some briefs include useful factual information, others are filed at the 11^{th} hour and include advocacy for a particular ruling but fail to provide useful factual information.

[11] In principle such information could be manipulated. However many groups, especially those repeatedly interacting with courts, care about their reputations with judges. As the relevant information can potentially be verified, discovery of information falsification or distortion could severely undermine a group's credibility. Knowing this should dissuade a group from manipulating the facts contained in its filing. Furthermore, modeling each group as having the capacity to provide hard information captures the substantive idea that briefs can provide useful information to judges.

[12] For example, Justice Ginsburg, in describing the task of her clerks, states: "Their job is to give me a road map through the case, and then I can read the briefs. They also tell me which of the green briefs (Amicus) I can skip" (Peppers and Ward, 2012, p. 395). This suggests that many briefs are note read carefully, and that the process through which briefs arrive on judges' desks is quite noisy.

gets a payoff of 0. Let $\mathbb{I}_{d=d_\omega}$ be an indicator function that takes a value of 1 if the decision matches the state and 0 otherwise. Consequently, the judge's payoff for choosing $d = d_1$ is $\mathbb{I}_{d_1=d_\omega} + \beta + \epsilon$, where $\beta \in (-1, 1)$ represents whether the judge has an ideological bias for or against decision d_1. Conversely, the judge's payoff for $d = d_0$ is simply $\mathbb{I}_{d_0=d_\omega}$.[13]

As for the groups, each group $i \in \{1, ..., N\}$ has known preferences over outcomes. Furthermore, groups can be categorized as either **biased** or **moderate**. If group i is biased in favor of decision d_1 then it gets a payoff of $v_i > 0$ when the judge chooses d_1 and a payoff of 0 otherwise. If group i is biased in favor of decision d_0 then its payoffs are specified analogously. Thus, the preferred decision of biased groups is invariant to the state of the world. On the other hand, if group i is moderate then its preferences over decisions depend on ω as it wants the judge's decision to match the state. As such, its payoff for decision d is $\mathbb{I}_{d=d_\omega} v_i$. Additionally, the v_i are common knowledge, with larger values representing greater stakes of the issue to group i.[14]

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 $i \in \{1, ..., N\}$ observes a private signal about ω, $s_i \in \{0, 1\}$, which is correct with probability π_i.

4. In the first stage of the process, each group decides whether or not to file an amicus brief and, if so, whether to include factual content in their filing.

5. If group i files then with probability p_i the judge learns the factual content (if any) of group i's brief and with probability $1 - p_i$ the judge only observes that the group filed.

[13] To more closely match decision-making on multi-member courts, an alternative formulation of our model would specify multiple justices with different ideological biases toward each decision but place the same relative weights on ω. 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 decision implemented. In this setup, the median justice's vote is decisive. As such, analyzing the one decision-maker setup is without loss of generality, since we can view her as the median judge. Similarly, to expand on our earlier discussion, if we instead consider our model as a theory of amicus briefs regarding 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 is a unique judge whom the groups target.

[14] We could instead assume that each group's payoff over each outcome depends on the state of the world. This formulation would allow us to relax the assumption that the signal is more informative than the prior belief. However, it would still be possible to partition groups by their biases in a similar fashion by incorporating payoffs and signal quality into the definitions of moderate and biased groups. Given this alternative set-up, while slightly more general, introduces significant notational complexity without producing further substantive insight, we utilize the simpler version of our model.

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

7. The judge receives a payoff of 1 if the decision matches the state and 0 otherwise, additionally, her utility is shifted by $\epsilon + \beta$ if she chooses $d = d_1$; group i gets utility v_i if the decision matches its preferred decision and 0 otherwise, minus private costs c_i that the group incurs if it files a brief.

3 Equilibrium Analysis

As our amicus brief model features incomplete information, we analyze the game by studying a selection perfect Bayesian equilibrium. As is standard in games with continuously distributed costs, we focus on equilibrium in which players use cut-point strategies. In such an equilibrium, each group uses a cut-off rule, conditioned on its signal, to determine whether to file, which decision to file in favor of, and whether to include hard information. 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) equilibrium behavior does not depend on strong assumptions about beliefs after off-path actions. In the following paragraphs, we define what a cut-point strategy entails, detailing behavior of judges, biased, and moderate groups. Then, we establish existence of equilibrium using these strategies and discuss additional characterization.

We begin with optimal judicial decision-making. Consistent with legal scholarship studying use of amicus briefs (e.g., Larsen (2014)), the judge accounts for each group's bias and incentives to influence her decision and rationally updates her belief over the state. Define a profile of outcomes as $o = (o_1, ...o_N)$. Specifically, for each group i, $o_i \in \{n, f_0, f_1, 0, 1, \phi\}$ denotes if the judge observes that (i) the group did not file, (ii) only the group files for d_0 or d_1, (iii) the brief includes hard information supporting d_0 or d_1, and (iv) the brief contains no useful information. The judge's belief that $\omega = 1$ following outcome o is $\mu_J(o)$, and it is derived via Bayes' rule whenever possible. The judge maximizes her expected utility after updating her belief. Formally, if $\mu_J(o) + \beta + \epsilon \geq 1 - \mu_J(o)$ then $d = d_1$ and if $\mu_J(o) + \beta + \epsilon < 1 - \mu_J(o)$ then $d = d_0$.[15]

Next, 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 about when the group files and adjusts her beliefs accordingly. Furthermore, with all groups making simultaneous filing decisions, each forms expectations about the others' filing behaviors. Thus, each group accounts for both the judge's and its own expectations about whether other groups will file. In a cut-point

[15] We assume the judge rules in favor of d_1 when indifferent. This is inconsequential as, given the shock ϵ, it is a probability 0 event.

equilibrium we assume that group i's strategy is characterized by cut-points $\bar{c}_i(s_i) \geq 0$ such that, after observing signal s_i, if $c_i \leq \bar{c}_i(s_i)$ then the group files and if $c_i > \bar{c}_i(s_i)$ then it does not. Let $\hat{c}_{-i}$ 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. This results in a group filing following signal s_i if its cost is below a cut-point $\bar{c}_i(s_i)$.

Furthermore, given that a group files it files in support of the policy it prefers, conditional on its observed signal. When using cut-point strategies a biased group always files in favor of its bias and only includes the factual information contained in its signal if it is consistent with its bias. In contrast, a moderate group always files in favor of the state that matches its signal, and always includes hard information corresponding to its signal when it files.

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 their strategies. For this characterization, it is crucial that groups are expected by one another, and the judge, to file according to a cut-point strategy. Moreover, the group's filing strategy must be optimal given the judge's beliefs about the group's information. The following result establishes existence, a byproduct of which is a simple characterization of equlibrium cutpoints.

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

1. *A cut-point equilibrium exists.*

2. *In any cut-point equilibrium if group i is biased in favor of decision d_1 then $\bar{c}_i(1) > \bar{c}_i(0) \geq 0$. By contrast, if group i is biased in favor of decision d_0 then $\bar{c}_i(0) > \bar{c}_i(1) \geq 0$.*

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

Importantly, in equilibrium the costs for which a group is willing to file or not is a function of its signal.[16] As figure 1 shows, a biased group files more often when it has favorable information compared to when it has observed an unfavorable signal. This difference in filing arises because the possibility that the judge carefully reads the group's brief makes filing riskier for a biased group with unfavorable 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 biased groups with favorable signals file more often, a judge only observing

[16]Even after restricting attention to equilibria with a cut-point form, multiple cut-point equilibrium may exist. This is due to different expectations over cut-points possibly leading to different solutions to the group's indifference conditions.

that the group files updates her beliefs favorably toward the group. Given biased groups' equilibrium behavior, a judge reading a brief from a biased group lacking hard information supporting its preferred decision correctly infers that the group's information is unfavorable. Consequently, it is unwilling to incur high filing costs when it is unable to provide a brief with favorable, factual, information. 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 learn of the group's inability to provide favorable factual information.

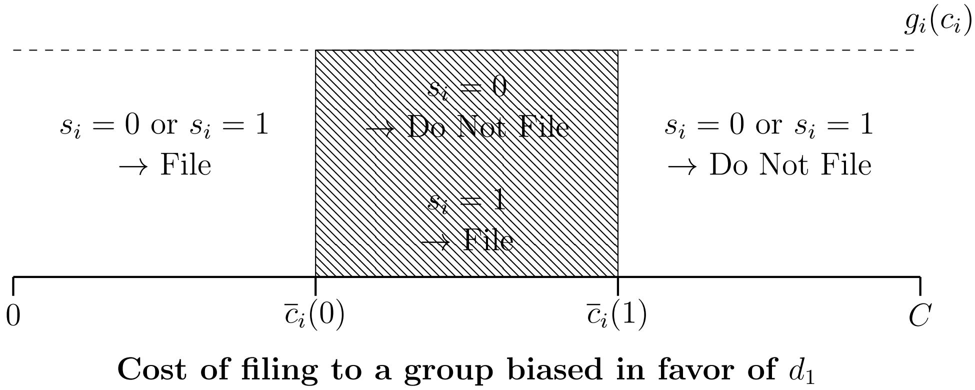

Figure 1: On the left side of the diagram, groups have very low filing costs and filing occurs no matter what signal is received; on the right side of the diagram, filing is prohibitively costly and filing never occurs regardless of signal; and in the shaded middle region, costs are at an intermediate level and groups file conditional upon observing a favorable signal.

Having examined the relationship between costs and bias, we now discuss how bias impacts informativeness. Cut-point equilibrium also capture important distinction between moderate and biased groups regarding filing informativeness. When moderate groups file briefs they support the decision that corresponds to their signals. The judge is then able to infer that these group have factual information that support the decision endorsed by the briefs without having to consider the arguments provided in the brief carefully. On the other hand, as briefs filed by biased groups support the same decision regardless of their factual information, the judge is unable to discern perfectly whether or not the brief provides hard information supporting the position advocated without going through and extracting the information in the brief. In this sense, moderate group briefs 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 which side they support or in which they always file in favor of their least preferred decision. However, the important feature common to 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 incorporating babbling has no effect on equilibrium outcomes, our results and discussion refer to the intuitive equilibria in which biased groups

Before continuing to our main results on group influence, we discuss three strategic tensions that can arise in equilibrium due to the interaction of multiple groups when deciding whether or not to file an amicus brief. In the appendix, we analyze special cases of our model further highlighting these trade-offs.

The first such tension involves incentives for groups to free-ride on each others' filings. That is, a group may file less frequently if it anticipates that another group with similar preferences will file. Thus, our model can be interpreted as incorporating a strategic rationale for groups to try and overcome this impediment by coordinating on filings ahead of time. Indeed, the broader literature on amicus filings emphasizes that groups frequently coordinate with one another when filing. While we do not explicitly model this coordination process, an individual group in our model can be interpreted as reflecting the combined effort of multiple groups which have effectively overcome the free-rider problem. In this case, assuming that the group has a high π_i may be reasonable due to it having the combined knowledge and resources of multiple allies. The second strategic tension concerns how groups respond to the existence of others with opposed preferences. This can improve the judge's welfare as, in disciplining the filing behavior of groups, competition improves the judge's ability to infer information from filings. However, in other cases adding a second competing group may lower judicial welfare by decreasing the informativeness of behavior when neither group files. The final tension involves the impact of judges having a high capacity for thoroughly analyzing briefs. Ironically, in such instances biased groups can be better for the judge than moderate groups, as more information about the state of the world will be inferred.

4 The Influence of Amicus Briefs

We now turn to studying the actual influence of amicus briefs. As discussed, a central goal in the study of amicus briefs is determining whether or not briefs influence decision-making on the court. Fortunately, our formal framework allows a precise analysis of influence. We can derive clear results tying group interests and characteristics to equilibrium influence levels.

We assess influence by following existing literature defining influence as the difference in the probabilities that the judge rules in favor of a group's preferred outcome given that the group does and does not file. Formally, **influence** is given by

$$Pr(d = \delta | \text{ i files in favor of } d_j) - Pr(d = \delta | \text{ i does not file}),$$

where δ is the group's preferred decision after observing its signal. The first term in our

endorse their preferred decision.

definition of influence is the probability the group's preferred decision is implemented when when we observe it file. However, as our definition of influence implies, this alone does not measure group influence, as we want to determine the impact filing a brief has on changing the outcome. We must also account for the probability that the group would have gotten its preferred outcome had it not filed. This is captured by the second term. Overall, then, a brief's influence determines how much more likely the group is to get what it wants when it files versus when it does not.

For briefs to be influential they must provide judges with relevant information. 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. However, this is not the case. As implied by our next result, in equilibrium the judge will infer information from a group's brief that, in expectation, makes her more likely to side with the group.

Lemma 1. *For each group i if $p_i > 0$ and $v_i > 0$ then influence is strictly positive.*

Even though group bias is fully known and judges may fail to analyze carefully the information contained in briefs, the strategic nature of filing decisions means that they may still convey useful information about the state of the world. While the judge is fully aware of the bias of groups, and acknowledges that briefs are filed with a particular goal in mind (Larsen, 2014), they still find value in briefs. The sheer act of filing a costly brief indicates that a group is more likely than not to possess information that is both useful and supports its preferred decision.

4.1 The Effect of Group Bias on Influence

Having established that briefs convey information, we turn to what causes variation in group influence. Because the judge does not always carefully read each brief, she infers information in these filings from the group's strategic behavior, and, thus, information transmission is conditioned by known characteristics of the amici filers themselves. Accordingly, our analysis demonstrates that group identity and characteristics matter for understanding the influence of briefs on judicial decision-making.[18]

Perhaps the most notable difference among organizations likely to be sufficiently resourced to file a viable brief are their ideologies or biases. Intuitively, this should condition

[18] A related claim has been articulated by the "affected groups" hypothesis (Collins, 2004). This theory emphasizes that amicus briefs influence the court because they signal the breadth of interests that are potentially affected by the decision. Our model provides an alternative strategic logic for why filers' identities may contain relevant information — even though the judge's utility is not directly dependent upon these groups' preferences. As the germane information in filings involves groups' private signals, the judge uses the information that she has about groups' characteristics to form beliefs about the information that they possess, even without carefully reading their briefs.

how judges view what such groups submit and, thus, how much influence anyhirgroup's brief has on the outcome. But how differences in bias translate into differences in influence is not straightforward.

In this vein, our results show that biased and moderate groups differ fundamentally in the comparative stability of their influence with respect to some factors but not others. In particular, relative to moderate groups, biased groups' influence is more sensitive to variation in either issue stakes or the probability that a judge carefully reads a filing. By contrast, the influence of both biased and moderate groups is highly sensitive to the quality of the group's information, i.e., we do not find a discrepancy between how information quality conditions the impact of either type of group.

Our next proposition highlights that, indeed, there is a clear difference in whether a filer is moderate or biased on how much impact a filing has on the judge's belief.

Proposition 2. *Given judicial belief μ_J, after observing group i file in favor of decision d_1 the judge's updated belief is weakly greater when group i is moderate than when it is biased in favor of d_1. An analogous result holds for decision d_0.*

Proposition 2 implies that in the one group case influence is weakly larger for a moderate group. This is true even accounting for the fact that judges might read and determine a the brief's factual content. It is also true in the N group case if we compare the judge's belief following the outcome of filings by each group besides group i with that after observing group i's filing. Put simply, filings by moderate groups are more informative than those by biased groups.

This result has important implications for empirical studies of amicus brief influence. When conducting such analyses, it is tempting to draw conclusions based only on observed filings. However, our results suggest that when analyzing the first term of influence of amicus briefs, only counting such filings will bias results in favor of concluding that moderate groups are most influential. As the definition of influence as changing judicial choices makes clear, it is necessary to account for a judge's decision conditional on a group *not filing*. Indeed, it is possible that looking only at cases of "success" in the context of observed filings will suggest an incorrect pattern of influence.

To illustrate this potential for incorrectly attributing influence, consider the following simple example applying our model.

Example 1. *Assume there is only one group, the group knows the state with certainty, $\pi = 1$, the group places value $v = .9$ on the issue, costs for filing are drawn uniformly over $[0, 1]$, the prior belief is $q = .5$, and when the group files the judge observes the group's information with probability $p = .5$. In this example there is a unique cut-point equilibrium.*

If the group is moderate then $\overline{c}(1) = \overline{c}(0) = .45$*. Given the group files, the probability it gets what it wants is* 1*. This is because the group knows the state and the judge knows that the group files in favor of its information. If it does not file then, since the group files with the identical probability following either signal, the judge does not update against the group and the probability it gets its preferred decision is* .5*. Thus, its influence when moderate is simply* .5*.*

On the other hand, if the group is biased then $\overline{c}(1) \approx .54$ *and* $\overline{c}(0) \approx .085$*. In this case the probability that the group gets what it wants if it files is only* .864*. Thus, only observing the group when it files would lead one to conclude that the moderate group is more influential. However, a closer look reveals that the biased group only gets its preferred decision with probability* .34 *when it does not file. Thus, the influence of the biased group is* .524*, which is actually greater than that of the moderate group — even though in equilibrium the moderate group always achieves its preferred outcome when it files.*

While proposition 2 shows that the first term of influence is always higher for moderate groups, also note that this term is not a function of v for moderate groups. Thus, the probability that a moderate group gets what it wants when it files is *not* a function of how much it cares about the issue. This is not true, however, for biased groups for whom in general both terms depend on value. To highlight this difference, consider the following stark example where changing v does not affect moderate group influence at all but alters biased group influence.

Example 2. *Consider the parameters from example 1:* $p = .5, q = .5$*,* $\pi = 1$*, and uniform costs, but let* v *vary. In this case, there exists a unique cut-point equilibrium.*

If the group is moderate then how frequently it files changes depends on v*. However, its influence remains* .5*, as regardless of how frequently it files, a moderate group still obtains its preferred outcome when it files. Thus, influence is not a function of* v*. On the other hand, if the group is biased then the influence its amicus brief depends on its stakes in the issue. For example, when* $v = .25$ *its influence is approximately* .3*, while from the earlier example we know that raising* v *to* .9 *increases its influence to approximately* .54*.*

Beyond differences in the value placed on the issue, the likelihood that the judge reads the information contained in a brief also varies by group. Similar to the results for variation in issue stakes, how sensitive a group's influence is to variation in the judge's probability of reading a brief is conditioned by whether the group is moderate or biased.

Proposition 3. ***(Influence and*** p_i***)***

1. *If group i is biased then changing p_i affects its influence. In particular, if $p_i \to 0$ then group i's influence goes to 0. If p_i is sufficiently high then group i only files when its signal matches its preferred policy.*

2. *If group i is moderate then changing p_i does not change its influence.*

Proposition 3 demonstrates that the probability the judge extracts information from the contents of a brief significantly impacts the influence of group's filing decision and influence. A biased group's decision whether to file depends upon its observed signal. In the limit, it adopts the same filing decision rule whatever signal it receives, which results in it having no influence. In contrast, when the judge is very likely to read the brief's factual content, a biased group is very unlikely to file a brief without observing a favorable signal. Alternatively, a moderate group's influence is invariant to the probability that the judge reads the brief, as the decision that the moderate group files in favor for matches its signal. Whether the judge reads its brief is inconsequential.

These results from the last proposition also demonstrate two benefits of policies strengthening judicial ability to assess claims. First, such policies could increase judicial expertise directly in any number of ways so that more information could be garnered from a filing. For example, judges could be allocated greater resources to hire high quality staff. Alternatively, rules could be changed so that briefs were required to be more transparent, which would strengthen de facto judicial expertise; for instance, consistent with the advocacy in Larsen (2014) for adopting measures increasing the methodological transparency of filings containing data as a means of reducing the ambiguity of the information contained in many briefs, standards for what constitute amicus "facts" could be implemented. Second, and less directly, policies strengthening judicial abilities to deal with claims could impact who files in a way providing the judge with more information. Specifically, greater judicial ability to assess briefs would discourage groups receiving unfavorable signals from filing in the first place. As a result, judges would infer groups' signals with very high precision *even if* they do not extract a brief's factual content.

A final result from our analysis involves the quality of group information, which stands in contrast to the results for issue stakes or the probability that a brief is read. As discussed, moderate group influence is relatively invariant to changes in these latter factors. Conversely, information quality works analogously regardless of group preferences. Specifically, some groups may have better access to high quality information relevant for judicial decision-makers than others. In our model, this translates into differences in the probability that the group's signal matches the state of the world. But, unlike p_i, the quality of the group's signal affects the influence of both moderate and biased groups. Furthermore, unlike the stakes v, the quality of the signal affects both terms of influence for moderate groups as well as their more biased counterparts. Thus, a group's information quality is a strong determinant of its influence regardless of its ideology. Indeed, in general, for biased or moderate groups, letting $\pi_i \to 1/2$ reduces their influence to 0.

In sum, our results suggest that the influence of biased groups is highly sensitive on their specific characteristics and the amicus environment. The influence of moderate groups, however, is much less context sensitive. Only for information quality do we find comparable results regardless of the group's position.

4.2 Empirically Assessing Amicus Influence

As discussed, measuring the influence of briefs on judicial decisions is the primary objective in many empirical studies of the amicus process. Further, numerous attempts to assess the impact of amicus activity on judicial decisions empirically have produced mixed results. As Kearney and Merrill (2000) pointed out a number of years ago, empirical findings have been "confusing and contradictory" (p. 774), a description that remains apt to the present. Some uncover evidence indicating influence (Collins, 2004; Collins Jr, 2008; Becker Kane, 2017), others find no effect (Songer and Sheehan, 1993; Spriggs and Wahlbeck, 1997), and still others discover conditional impacts (Kearney and Merrill, 2000; Box-Steffensmeier and Christenson, 2014; Syzmer and Ginn, 2014).

In clarifying what constitutes influence and highlighting the difficulties of learning about the impact of amicus briefs from observed filings and decisions, our theory suggests some potential reasons for these conflicting findings. In particular, our formal definition of influence underscores the inherently *counterfactual* logic that arises in assessing how the amicus process may impact outcomes. Indeed, this defintion shows the shortcomings of estimating influence based on observed filing decisions and outcomes is an important task. For any single case, we can only observe a group filing or not filing, never both. This is the fundamental problem of causal inference, and it prevents us from learning about a group's influence on any single case. While our definition of influence regards influence on a particular case, we must aggregate across cases to generate an estimate of influence.

On a positive note, our model provides a means of engaging in such aggregation in a way allowing valid inferences to be drawn from available observational data. This can be clearly seen by initially focus on the case where there is only one interest group with a known bias in favor of d_1.[19] Analyzing a single group allows us to, in a sense, hold other groups' filings constant, creating a "best case" for detecting influence.

[19]Our qualitative results in this section also apply to moderate groups.

As a first step in trying to uncover influence, consider how filings shift the judge's belief in equilibrium. As shown in the previous section, filings may both convey information directly and indirectly via a strategic channel. The latter implies that observing a group's failure to file is informative. Indeed, our model reveals a noteworthy wrinkle in the typical informational logic; judges will find the identity of groups *not* filing briefs useful information. The judge believes with some probability that a decision to not file was made due to the group receiving a signal contrary to its preferred policy. We now establish this result formally.

Lemma 2. *Consider the one-player model. Let μ_f be the judge's updated belief after observing the group file, and let μ_n be the judge's updated belief after observing the group not file. In any equilibrium, $\mu_n \leq p \leq \mu_f$.*

Thus, this demonstrates that both filing and non-filing can influence judicial decisions by impacting the judge's belief. A group expected to file that is observed to sit the case out will lead the judge to infer that it was unlikely to have had favorable information and to update against the group's preferred policy. This finding would not seem to be just an artifact of our model, as court observers do note non-filings by important and relevant interests.[20] Hence, accounting for how not filing affects a group's ability to get what it wants is potentially crucial.

Given this, it is then essential for understanding influence to know when groups are expected by a judge to file in the first place. While groups care deeply about the outcomes of some cases, they are likely relatively indifferent about other rulings. In terms of our model, when a case is "relevant" for a group it can be thought of as having a strictly positive v_i, whereas $v_i = 0$ if it is "irrelevant."[21]

As such, our model reveals an important if intuitive connection between a group's interest in a case and its equilibrium influence level. A group with a stake in the case is expected to file with some probability, and its filing decision will hold influence. A group with little at stake will not find it worthwhile to file in equilibrium, and it will lack influence. Our next result summarizes this relationship in the context of the one-player version of our model.

Lemma 3. *In the one-player model,*

1. *If the case is relevant to the group its equilibrium influence is strictly positive.*

2. *If the case is irrelevant to the group its equilibrium influence is 0.*

[20] For examples, see Kontorovich (2014) and O'Neil (2015).

[21] Although it may seem stark to distinguish between groups with arbitrarily small v_i and groups with $v = 0$, this apparent abruptness disappears if there is a known fixed cost of filing. In this case, there would be a strictly positive cut-off in v_i above which the issue is relevant for the group and below it is irrelevant.

Lemma 3 reveals, to reiterate intuitively, that a group's influence on a given case depends crucially upon whether it places value on the judge ruling in its preferred direction. As a group *never* files in equilibrium regarding an irrelevant issue, its failure to file has no effect on the judge's belief and, by extension, no influence on the outcome. Alternatively, a group valuing an outcome has influence, which can be a function of its not filing as well as its filing.

Having established that filing and non-filing can be influential, as conditioned by the value that a group puts on an outcome, we can now turn to the consequences of our analysis for empirical studies. Our goal, of course, is obtaining an estimate of the group's influence across cases. We continue to focus on the simple case where there is a single group biased in favor of d_1.

Suppose that we possess data on all cases heard, as well as whether the group filed in each particular case. Let the group's average influence level across a dataset of M cases be defined as :

$$\frac{1}{M}\sum_{k=1}^{M}\Big[Pr(d=d_1|\text{ group files in case }k)-Pr(d=d_1|\text{ group does not file in case }k)\Big]$$

As, from lemma 3, group influence varies based on whether the group values a ruling in its favor or not, we can decompose influence among cases relevant and not relevant for the group. Let v^k be the group's value for case k and define $R\subseteq M$ as the set of relevant cases ($v^k>0$) and $I\subseteq N$ as the set of irrelevant cases ($v^k=0$). We can now rewrite the group's average influence as:

$$\frac{1}{M}\Big(\sum_{k\in R}\Big[Pr(d=d_1|f^k,k\in R)-Pr(d=d_1|n^k,k\in R)\Big] + \sum_{k\in I}\Big[Pr(d=d_1|f^k,k\in I)-Pr(d=d_1|n^k,k\in I)\Big]\Big)$$

where, for notational simplicity, $Pr(d=\delta|f^k)$ and $Pr(d=\delta|n^k)$ denote the probabilities the judge issues the group's preferred ruling given that it does and does not file on case k, respectively. By lemma 3, the second summation is equal to 0, as influence on cases that are not relevant is equal to 0. We can therefore rewrite the average level of a group's influence as

$$\frac{1}{M}\sum_{k\in R}\Big[Pr(d=d_1|f^k,k\in R)-Pr(d=d_1|n^k,k\in R)\Big].$$

Note that the average influence level only depends upon the judge's decision on cases relevant for the group, as well as the total number of cases. As lemma 3 shows, the group has no influence on cases irrelevant to its interests.

While a group's influence is only strictly positive in cases of interest, one might question whether knowledge of which cases the group views as relevant is an important part of assessing its influence empirically. After all, if a group does not influence outcomes when it is not interested in a case, might it be safe treating all cases as equal and assume that no filing leads to no influence? Our model shows this is incorrect. Distinguishing between cases that are and are not relevant is fundamental, and failing to do so for each group will lead to faulty inference. The next result establishes this formally.

Proposition 4. *Let $\hat{I}$ be the observed difference in the probability a judge files in favor of a group's preferred outcome among cases where a group files and where they do not file. $\hat{I}$ is strictly less than the true average level of equilibrium influence.*

Proposition 4 demonstrates that failing to account for heterogeneity in group interest across cases will produce a biased influence estimate. In particular, failing to account for group interest will bias findings *against* detecting influence. Put simply, the model highlights a source of sample selection. This stems from observed filings only coming from groups with a stake in the issue at hand, and observed non-filings arising either when a group is uninterested in the case or when a group is interested but finds the cost of filing prohibitive — which is particularly important if the group is unable to provide favorable information. Thus, treating all non-filings as equal will lead to faulty inference. In sum, while our theoretical analysis poses a serious challenge to existing empirical studies of amicus influence, leading us to question some of the findings, it also suggests a relatively simple solution.

Although the issue that we have highlighted is fundamentally one of sample selection (i.e., do we include or exclude cases about which a group has no interest), our proposed solution is simpler than model-based sample selection corrections typically employed by social scientists. Here, a fix only requires coding a single additional variable for each potential filer. Since the root of the issue is differences in group interest across cases, accounting for these differences offers a solution. This can be straightforward given qualitative knowledge of cases and group interests, which could allow coding of groups likely to have a stake in a particular case independent of whether they file or not. With this variable in hand, both $Pr(d = d_1|f^k, k \in R)$ and $Pr(d = d_1|n^k, k \in R)$ can be estimated by simply taking means, allowing the number of relevant issues for a group to be computed easily. These quantities could then be employed to generate an unbiased average influence estimate.[22]

Thus, researchers would ideally collect data on the universe of possible filers for each case to control for the number of non-filings as well as the identity of the non-filers. One

[22]Scholars may also be interested in a group's influence on relevant cases. With the aforementioned variable in hand, this can be calculated as $\frac{1}{|R|}\sum_{k\in R}\Big[Pr(d = d_1|f^k, k \in R) - Pr(d = d_1|n^k, k \in R)\Big]$.

could counter that the universe of potential filers is quite large and many groups may only be interested in a few cases. While possibly a significant impediment, substantial progress could be made by gathering data on a subset of prominent groups, and calculating influence only for this subset. This is similar in spirit to a portion of the analysis in Kearney and Merrill (2000), which focuses on a subset of regular filers, such as the ACLU. An advantage of analyzing these groups is that they file regularly, and judges are likely to both anticipate the group's desired outcome on a particular case and to note whether the group filed or not. It is also realistic to assume that, because of the general nature of interests of groups such as the ACLU, they are likely to have some interest in myriad cases.

4.3 How Judicial Auditing Affects Influence

Finally, we analyze how the influence of briefs is altered if the judge strategically chooses whether or not to read a filing. Our baseline model abstracted from such auditing to incorporate other aspects of the amicus environment important to understanding the trade-offs faced by groups when filing and in a manner tractable enough to analyze the effectiveness of briefs.[23] To build in endogenous auditing, we focus on the case with one group here and study examples with two groups in the appendix.

In doing so, we find that our conclusions about moderate groups from the exogenous auditing continue to hold, and that allowing for endogenous auditing provides a deeper understanding of these insights. Specifically, the endogenous auditing of briefs by the courts differentially effects influence depending on whether the group is biased or moderate. Similar to our baseline results, moderate group influence is not sensitive to endogenous auditing, while biased group influence grows when the judge is able to strategically read briefs. Additionally, which briefs the judge wants to allocate her time and resources toward depends on filing group characteristics.

Consider an altered version of our amicus model with one group in which judges choose whether to read a brief or not. Rather than assuming that the judge reads group i's brief with probability p_i, we now model the judge's decision to read a brief as an endogenous choice. Formally, we assume that, after a group chooses whether to file, the judge learns her private cost c_J, which is drawn from distribution $G_J(c_J)$. After learning this cost, the judge chooses to either read the brief, paying cost c_J and learning the brief's factual content, or does not read the brief, paying no cost and remaining ignorant of the filing's factual content. After this, the game continues per the model previously studied, with the judge receiving a

[23] An additional interpretation of the baseline model is that group reputations are relatively fixed at the time of the case and, thus, the judge commits to reading briefs from some groups with a higher probability, i.e., she directs her clerks ahead of time to focus on briefs from certain groups should they file.

shock to her utility and issuing a ruling.

As foreshadowed, the impact of auditing is qualitatively different depending on whether the group in question is moderate or biased. The next result establishes this differential effect that endogenous auditing of filings has on group influence depending on group ideological orientation.[24]

Proposition 5. ***(Group influence and auditing)***

1. *If the group is biased then its influence is positive when the judge has the ability to audit. However, if the judge could never audit then it has no influence.*
2. *If the group is moderate then its influence is the same under both strategic auditing and no auditing.*

This result indicates that allowing the judge to choose which briefs to read carefully, rather than assuming an exogenous probability of reading, can encourage more informative and more influential filing behavior. However, this effect is not uniform across groups. Only biased group behavior changes when the judge chooses whether or not to read a brief. Interestingly, analogous to previous results, a change in influence comes through direct and indirect channels. Information is translated directly when a judge reads a group's brief, and is transferred indirectly through the group's strategic filing decisions. Our analysis shows that the direct channel is necessary for the indirect channel to operate for biased groups, as such groups will only have influence if there is some threat that the judge will read their briefs. In contrast, this is not true for moderates, as their filings are informative even when there is no expectation that the judge will verify filing content.

The endogenous auditing model also provides insights into which briefs the judge will spend time and effort reading closely. The judge targets different briefs depending on filing group characteristics. Also, when we analyze special cases of our model with two groups to further understand judicial incentives we find that, consistent with proposition 5, the judge may spend time reading a brief submitted by a biased group but never a moderate group (see appendix). The moderate group reveals its signal through which side its brief supports, so the judge need not expend resources assessing the details of the group's filing. Intuitively, we also find that if two biased groups file a brief, but one group's signal is much more accurate, then the judge targets the high quality group.

[24]In studying endogenous auditing we focus on equilibrium that can be characterized using cut-point strategies similar to those in the baseline analysis. Importantly, cut-point equilibria continue exist in the cases we analyze with endogenous auditing (see appendix).

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, although legal scholars have spent much 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 and its extensions are necessarily highly stylized, they offer a variety of insights into the roles of briefs and judges, and also provide a lens to understand empirical studies, the difficulties that they must confront, and what might constitute solutions.

We have shown that filer interests play an important role in conditioning influence. While the most preferred policies of groups are known in our model, amicus filers may vary both in the value that they place on the issue at stake and in the quality of information that they can provide. Both characteristics interact with ideology to impact the decision to file and the amount of communicated information. However, both biased and moderate groups with poor information are unlikely to file and thus carry little influence. Neither the technical nor the strategic informational content of their filings are of use to the judiciary.

Our results also highlight previously unacknowledged roadblocks for empirically studying amicus influence with observational data. In particular, our model's informational logic demonstrates that the decision *not* to file a brief provides judges with useful information. We must distinguish between non-filings involving groups which are interested but not filing due to either prohibitive cost or the inability to provide useful information, and non-filings due to group apathy about case outcome. Not accounting for non-filing and these different mechanisms will result in faulty inferences about amicus influence's existence and degree.

Finally, we considered a judge's ability to review briefs strategically by extending the model to include endogenous auditing. In line with our other results, auditing's threat impacts biased and moderate groups differently. While auditing "disciplines" biased groups, increasing their influence in the process, it does not impact moderates because they engage in informative filing behavior in the absence of this threat. An implication is that, given limited time to review filings, judges will direct their attention toward the filings of biased rather than moderate groups.

Since our analysis is the first to explicitly model amicus brief influence at the merits stage, there are a number of ways to build on it that leap to mind. For instance, our model begins after a case is placed on the docket. While a useful abstraction, 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 dynamics of the amicus process; 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 incorporating such aspirations may provide insights for how group reputation and information provision develop over time. Another possibility would be to delve more deeply into coordination. Our analysis demonstrates that groups have an incentive to free-ride on the efforts of groups with similar interests and, thus, may want to coordinate with one another. Though we abstract from this by assuming that any coordination between groups has already occurred, explicitly modeling the process through which groups coordinate on filings may uncover interesting new incentives for groups that participate in the amicus process.

A Proofs and Omitted Examples

A.1 Equilibrium Analysis

Proof of Proposition 1

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 each group's indifference condition between filing and not filing.

Recall that, given belief μ_J, the judge's expected utility for choosing d_1 is $\mu_J + \beta + \epsilon$ and her expected utility for d_0 is $1 - \mu_J$. Thus, we obtain the characterization of judicial behavior by setting $\overline{\epsilon} = 1 - 2\mu_J - \beta$. Additionally, note that $\overline{\epsilon}$ is strictly decreasing in μ_J.

Next, 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 $\tilde{o}$. In particular, for each group i after observing signal s_i there is some cut-point $\overline{c}(s_i)$ such that if $c_i \leq \overline{c}(s_i)$ then the group files, otherwise it does not. Additionally, if group i is biased it always files in favor of its preferred decision while if it is moderate it files in favor of its signal.

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 $\tilde{o}_i \neq y$. Given belief μ_J and conjectured cut-points $\hat{c} = (\hat{c}_1(0), \hat{c}_1(1), ...\hat{c}_N(0), \hat{c}_N(1))$, the probability that $\omega = 1$ after observing 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

$$P(\omega = 1|\tilde{o}_i = 1) = \frac{\pi_i \mu_J}{\pi_i \mu_J + (1-\pi_i)(1-\mu_J)},$$

$$P(\omega = 1|\tilde{o}_i = 0) = \frac{\pi_i(1-\mu_J)}{\pi_i(1-\mu_J) + (1-\pi_i)\mu_J},$$

$$P(\omega = 1|\tilde{o}_i = f) = \\ \frac{\mu_J\Big(\pi_i G(\hat{c}_i(1)) + (1-\pi_i)G(\hat{c}_i(0))\Big)}{\mu_J\Big(\pi_i G(\hat{c}_i(1)) + (1-\pi_i)G(\hat{c}_i(0)\Big) + (1-\mu_J)\Big(\pi_i G(\hat{c}_i(0)) + (1-\pi_i)G(\hat{c}_i(1)\Big)},$$

$$P(\omega = 1|\tilde{o}_i = n) = \\ \frac{\mu_J\Big(\pi_i(1-G(\hat{c}_i(1))) + (1-\pi_i)(1-G(\hat{c}_i(0)))\Big)}{\mu_J\Big(\pi_i(1-G(\hat{c}_i(1))) + (1-\pi_i)(1-G(\hat{c}_i(0)))\Big) + (1-\mu_J)\Big(\pi_i(1-G(\hat{c}_i(0))) + (1-\pi_i)(1-G(\hat{c}_i(1)))\Big)}.$$

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 ω we can obtain $\mu_J(\tilde{o})$ by using the individual $P(\omega = 1|\tilde{o}_i)$ and sequentially updating, replacing μ_J, initially q, with the new belief after each update. Thus, because G_i is continuous in c_i the $P(\omega = 1|\tilde{o}_i)$ are continuous in $\hat{c}_i$, and the resulting sequentially updated belief $\mu_J(\tilde{o})$ is continuous in $\hat{c}_i$.

Let $P(d = \delta_i|\mu_J(o_i, o^{-i}))$ be the probability that the judge's decision matches group i's preferred decision, given group i's outcome is o_i and o^{-i} 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 $\epsilon > \bar{\epsilon}_{\mu(o_i,o^{-i})}$, i.e., $1 - F(\bar{\epsilon}_{\mu(o_i,o^{-i})})$.[25] On the other hand, if $\delta_i = d_0$ this is $F(\bar{\epsilon}_{\mu(o_i,o^{-i})})$. As $\mu_J(o)$ is continuous in $\hat{c}$ and $\bar{\epsilon}_\mu$ is continuous in μ we have that $P(d|\mu(o_i, o^{-i}))$ is continuous in $\hat{c}$. After group i observes signal s_i, using its expectation that other groups are using cut-point strategies $P(o^{-i}|s_i)$ represents the probability of outcome o^{-i} given signal s_i. Again, because the distribution over costs is continuous this yields that $P(o^{-i}|s_i)$ is continuous in $\hat{c}$.

For the next step, we introduce some notation. Let the probability that the judge im-

[25] Throughout, let F be the uniform distribution over $[-1, 1]$.

plements decision d_1, after observing player i offer filing f_j, and given outcome $o \in \mathcal{O}_{-i}$ in strategy profile σ as

$$P_o^\sigma(f_j) = \Bigg[p_i P\Big(d = d_1 | \mu(s_i, o)\Big) + (1 - p_i) P\Big(d = d_1 | \mu(f_j, o)\Big)\Bigg].$$

Additionally, for any $d \in \{d_0, d_1\}$ and $\omega \in \{0, 1\}$ define the following functions $V_i^g(d|\omega)$, for $g \in \{b, m\}$, as

$$V_i^b(d|\omega) = \begin{cases} v_i \text{ if } d = \delta_i \\ 0 \text{ else,} \end{cases}$$

where $g = b$ indicates that group i is biased and so V_i^b gives the payoffs to a biased group for each decision, note that it is independent of ω. Correspondingly, for a moderate group let $g = m$ and define

$$V_i^m(d|\omega) = \begin{cases} v_i \text{ if } d = d_\omega, \\ 0 \text{ else.} \end{cases}$$

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

$$U_i(f_j|s_i) = \sum_{o^{-i} \in \mathcal{O}_{-i}} \Bigg[\mu_i(s_i)\Big[V_i^g(d_1|1) P_o^\sigma(f_j) + V_i^g(d_0|1)(1 - P_o^\sigma(f_j))\Big] + \\ (1 - \mu_i(s_i))\Big[V_i^g(d_1|0) P_o^\sigma(f_j) + V_i^g(d_0|0)(1 - P_o^\sigma(f_j))\Big]\Bigg] P\Big(o^{-i}|s_i\Big) - c_i.$$

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

$$U_i(n|s_i) = \sum_{o^{-i} \in \mathcal{O}_{-i}} \Bigg[\mu(s_i)\Big[V_i^g(d_1|1) P\Big(d = d_1|\mu(n, o^{-i})\Big) + V_i^g(d_0|1)\Big(1 - P\Big(d = d_1|\mu(n, o^{-i})\Big)\Big)\Big] + \\ (1 - \mu(s_i))\Big[V_i^g(d_1|0) P\Big(d = d_1|\mu(n, o^{-i})\Big) + V_i^g(d_0|0)\Big(1 - P\Big(d = d_1|\mu(n, o^{-i})\Big)\Big)\Big]\Bigg] P\Big(o^{-i}|s_i\Big).$$

To show that an equilibrium in cut-point strategies 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 $f = f_{s_i}$.

As each ψ_i is summing over components that are continuous in $\hat{c}$ we know that each component of the vector-valued mapping ψ is continuous in $\hat{c}$, and thus ψ 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.

We now show that groups do not want to deviate by filing in favor of a different decision. First, consider a group biased in favor of decision d_1. If it deviates and files in favor of d_0 this is off-the-path of play. Thus, assigning any belief such that $Pr(s_i = 1|f_0) < Pr(s_i = 1|f_1)$ is sufficient to prevent the group from deviating. Next, consider a moderate group that has observed $s_i = 1$. As it has observed $s_i = 1$ and $\pi_i > q$ its expected utility for d_1 is greater than its expected utility for d_0. As the judge's expectation is that $s_i = 1$ if $a_i = f_1$ and is that $s_i = 0$ if $a_i = f_0$ we have, for any realization of outcomes for the other groups, o^{-i}, that $\mu_J(f_1, o^{-i}) > \mu_J(f_0, o^{-i})$. Therefore, taking expectations over outcomes yields that the probability $d = d_1$ is strictly greater if i chooses f_1 over f_0 and so if group i is moderate and files it will not deviate from filing in favor of its signal.

What remains to be shown is that in a cut-point equilibrium for a biased group each pairing $(\bar{c}_i(0), \bar{c}_i(1))$ is ordered according to proposition 1. Consider a group i with preference $\delta_i = d_1$. 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, $\bar{\epsilon}_{\mu(f,o^{-i})} \geq \bar{\epsilon}_{\mu(n,o^{-i})}$. However, for $c_i \in (\bar{c}_i(1), \bar{c}_i(0))$ 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.

Example: Free-riding groups

We now consider a simple example of our model to highlight that groups may have an incentive to free-ride on the filings of other groups with the same bias. Let $N = 2$, $\delta_1 = \delta_2 = d_1$, $\pi_1 = \pi_2 = 1$, $v_1 = v_2 = 1$, $p_1 = p_2 = 1$, $C = 1$, $\beta = 0$, $q = .5$ and let G be the uniform distribution.

As $p_i = 1$ neither group will ever file in a cut-point equilibrium if $\omega = 0$. Thus, $c_1(0) = c_2(0) = 0$. Using this and our analysis of judicial behavior we can write out the indifference conditions to solve for the equilibrium cut-points when $\omega = 1$ for each group as

$$c_1(1) = 1 - \hat{c}_2(1) - (1 - \hat{c}_2(1))\mu_J(n, n),$$
$$c_2(1) = 1 - \hat{c}_1(1) - (1 - \hat{c}_1(1))\mu_J(n, n).$$

Given the groups are using cut-point strategies the judge's belief after observing neither group file is

$$\mu_J(n, n) = \frac{(1 - \hat{c}_1(1))(1 - \hat{c}_2(1))}{1 + (1 - \hat{c}_1(1))(1 - \hat{c}_2(1))}.$$

Substituting this into the equilibrium conditions and solving the system of equations yields three cut-point point equilibrium. The first is a symmetric equilibrium in which $c_1(1) = c_2(1) = .43$. In the second, group 1 takes the lead and always files while group 2 free-rides and never files, $c_1(1) = 1$ and $c_2(1) = 0$. Finally, the reverse holds in the third equilibrium, with group 1 free-riding on group 2, $c_1(1) = 0$ and $c_2(1) = 1$.

Example: Competing groups

We now analyze cut-point equilibrium with two groups when the groups have opposite bias. Let $N = 2$, $\delta_1 = d_1$, $\delta_2 = d_0$, $\pi_1 = \pi_2 = 1$, $v_1 = v_2 = .6$, $p_1 = p_2 = .5$, $C = 1$, $\beta = 0$, $q = .5$ and let G be the uniform distribution. In this case, in a symmetric equilibrium the judge's belief following (f, f) and (n, n) is $\mu_J = .5$. The judge's belief following (f, n) and (n, f) are given by

$$\mu_J(f, n) = \frac{\overline{c}_1(1)(1 - \overline{c}_1(1))}{\overline{c}_1(1)(1 - \overline{c}_1(1)) + \overline{c}_1(0)(1 - \overline{c}_2(0))} \text{ and}$$
$$\mu_J(n, f) = \frac{(1 - \overline{c}_1(1))\overline{c}_1(1)}{(1 - \overline{c}_1(1))\overline{c}_1(1) + (1 - \overline{c}_1(0))\overline{c}_2(0)}.$$

Using this and substituting into the equilibrium filing equations we get $\overline{c}_1(1) = \overline{c}_2(0) \approx .43$ and $\overline{c}_1(0) = \overline{c}_2(1) \approx .03$. Taking these cut-points, it is straight-forward to calculate the probability that the judge makes the correct decision as $\approx .7$.

Example: Judicial welfare and group bias

Consider the parameters from the previous example. However, assume there is only one group. If that group is biased using the equilibrium equations and setting the parameters we get that a unique cut-point exists in which $\bar{c}_1(1) \approx .33$ and $\bar{c}_1(0) \approx .03$. Using this and the judge's updated beliefs after observing the group file and not file we get that the probability the judge makes the correct decision with one biased group is $\approx .58$. Now assume that instead the group is moderate. In this case, substituting into the group's equilibrium equations yields $\bar{c}_1(1) = \bar{c}_1(0) = .1$. Calculating the probability the judge makes the correct decision in this case yields $.55 < .58$. Thus, the judge is more likely to decide correctly when the group is biased. Note that this is for the case when $p = 1/2$; for higher p the effect is more pronounced as the biased group filing strategy becomes even more informative. However, for p sufficiently low the opposite conclusion holds, with there not existing an informative equilibrium when the group is biased for $p = 0$. Also, note that $.58 < .7$, indicating that under these parameters adding a second competing group is beneficial for the judge.

Now re-consider the parameters from the example with two groups that share a bias and consider how changing group bias and the number of groups changes the probability the judge makes the correct decision. With one biased group we get $\bar{c}_1(1) = 1$ and $\bar{c}_1(0) = 0$. Thus, the judge always decides correctly. On the other hand, if there is one moderate group we get $\bar{c}_1(1) = \bar{c}_1(0) = 1/2$, and the judge makes the correct choice with probability .75.

Turning to multiple groups and solving for cut-point equilibrium with two competing groups under these parameters yields $\bar{c}_1(1) = \bar{c}_2(0) = 1/2$ and $\bar{c}_1(0) = \bar{c}_2(1) = 0$. Under these strategies the judge makes the correct decision with probability .75. Finally, recall that with two groups that share a bias we have multiple cut-point equilibria. If the groups play the equilibrium in which one group always files and the other never files this is equivalent to the one bias group model and, hence, the judge will always make the correct decision. On the other hand, if the groups end up in the equilibrium where $\bar{c}_1(1) = \bar{c}_2(1) \approx .43$ and $\bar{c}_1(0) = \bar{c}_2(0) = 0$ then the judge only makes the correct decision with probability $\approx .72$.

Therefore, under these conditions only having one biased group is always at least weakly better for the judge than any other arrangement. Interestingly, having competing biased groups or one moderate group works out equally well, although it is inferior to one biased group. This is because the effect of competition on filing behavior has a balancing effect on the judge's belief following no filings that is similar to how the judge updates if a moderate does not file. Finally, if there are two groups with similar ideologies how well the judge does depends on if the groups are able to coordinate on filings or not. If the groups do not coordinate on a "free-riding" equilibrium then the judge is strictly worse off under this arrangement compared to any other. On the other hand, if one group always takes a step back and the other group is always the filer then multiple friendly groups works as well as if there was only one biased group.

A.2 Group Bias and Influence

Proof of Lemma 1

Fix a cut-point equilibrium and consider a group i biased in favor of d_1. For any realization of outcomes for the other groups, o^{-i}, because $\overline{c}(1) > \overline{c}(0)$ if the judge observes that group i filed by Bayes' rule $\mu_J(f_1, o^{-i}) > \mu_J(n, o^{-i})$. Furthermore, by $\overline{c}(1) > \overline{c}(0)$ if the judge audits group i's brief then, having only observed f_1, in expectation the judge is more likely to learn that $s_i = 1$ rather than $s_i = 0$. Because $\overline{\epsilon}$ is strictly decreasing in μ_J this yields $Pr(d = d_1|f_1, o^{-i}) > Pr(d = d_1|n, o^{-i})$ for realization o^{-i}. As this holds for every outcome o^{-i} taking expectations over outcomes yields $Pr(d = d_1|f_1) > Pr(d = d_1|n)$ as required.

Similarly, consider a moderate group that observes $s_i = 1$. If we observe that the group files in favor of decision d_1 then the judge updates that group i's signal is $s_i = 1$. On the other hand, because $c_i(1) < C$ if the group does not file then the judge has some uncertainty over whether the group's signal is $s_i = 1$ or $s_i = 0$. Therefore, for any realization of outcomes o^{-i} we have $\mu_J(f_1, o^{-i}) > \mu_J(n, o^{-i})$. Because this holds for any realization o^{-i} taking expectations over the other group's outcomes we get that if group i observes $s_i = 1$ then the probability $d = d_1$ when the group files is greater than the probability $d = d_1$ if it does not.

Analogous proofs show the result if group i is biased for d_0 or is moderate and observes $s_i = 0$.

Proof Proposition 2

Recall that, in a cutpoint equilibrium, the judge's belief after observing a moderate group file in favor of d_1 is the same as when the judge observes the moderate group's signal directly. That is, for a moderate group i, the judge's belief after observing the moderate group file is equal to $Pr(\omega = 1|\tilde{o}_i = 1)$, as defined in the proof of proposition 1.

Next, recall that the judge's belief is equal to $Pr(\omega = 1|\tilde{o}_i = f)$, as defined in the proof of proposition 1, after a biased group files in favor of d_1. Finally, note that $\pi_i > \max\{q, 1-q\}$ and $\overline{c}_i(1) \geq \overline{c}_i(0)$ for a group biased in favor of d_1 implies $Pr(\omega = 1|\tilde{o}_i = 1) \geq Pr(\omega = 1|\tilde{o}_i = f)$ which yields the required result.

Proof of Proposition 3

We prove the proposition in three parts. First, we show that as $p_i \to 0$, equilibrium influence for biased groups also approaches 0. Second, we show that for p_i sufficiently high, biased groups do not file when they receive a signal contrary to their bias. Third, we suppose the group is moderate and show that if σ is a cut-point equilibrium given p_i then it is still a cut-point equilibrium for any $p_i' \neq p_i$.

For the first two steps, let group i be biased in favor of outcome δ_i. The difference in cut-points for group i is given by

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

To establish the first part of the proposition, we show that an equilibrium exists in which $|\bar{c}_i^*(1) - \bar{c}_i^*(0)| = 0$. First, rewrite equation (1) as

$$\Big|[U_i(f_{\delta_i}|s_1 = 1) - U_i(f_{\delta_i}|s_i = 0)] - [U_i(n|s_i = 0) - U_i(n|s_i = 1)]\Big|. \quad (2)$$

Assume the judge and other groups 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 ω 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 (2) is 0. Similarly, the utility to the group for not filing is the same following either signal. As such, equation (2) 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 $\bar{c}_1(1) \to 0$ and $\bar{c}_1(0) \to 0$. This establishes the first part of the proposition.

Second, we continue to assume that group i is biased in favor of outcome δ_i. Further, let $p_i = 1$, and suppose that group i has received signal $s_i \neq \delta_i$. In this case,

$$\bar{c}_i(0) = \sum_{o^k \in \mathcal{O}_{-i}} v_i \Big[P\Big(d = \delta_i|\mu(s_i, o^k)\Big) - P\Big(d = \delta_i|\mu(n, o^k)\Big)\Big] P\Big(o^k|s_i = 0\Big).$$

Following any action by the group the judge's belief cannot shift by more than it would had she actually observed the group's signal. Thus, $P\Big(d = \delta_i|\mu(s_i, o^k)\Big) - P\Big(d = \delta_i|\mu(n, o^k)\Big) < 0$. Because the group's gain following any outcome is always strictly negative it must be that at $p_i = 1$ we have $\bar{c}_i(0) = 0$. Further, because the inequality is strict, this implies that there exists some $\bar{p}_i < 1$ such that for all $p_i > \bar{p}_i$, $\bar{c}_i(0) = 0$. This establishes the second part of the result.

For the third and final part of the proposition, assume that group i is moderate. Recall that in a cut-point filing equilibrium, moderate groups always include factual information in their briefs and file consistent with the signal they receive. These two features imply that the judge's belief after observing a moderate group file in favor of d_i, $\mu(d_i, o)$ is equal to the judge's belief after observing the moderate group's signal directly, $\mu(s_i, o)$. This implies that, in a strategy profile σ, the judge's decision is constant in p_i for a moderate group.

To complete the proof, 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. Additionally, let $U_i(a|\sigma, p)$ be player i's utility for action a in assessment σ given extraction probabilities p. Finally, the fact that the judge's decision is constant in p_i for moderate groups implies that that for every p and p',

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

for all players i and actions a_i. Therefore, if σ is an equilibrium assessment under p, it is an equilibrium assessment under p'.

Proof of no influence when $\pi_i = 1/2$

Recall that in equilibrium

$$\sum_{o^k \in \mathcal{O}_{-i}} v_i \left[p_i P\Big(d = \delta_i|\mu(s_i, o^k)\Big) + (1 - p_i) P\Big(d = \delta_i|\mu(f, o^k)\Big) - P\Big(d = \delta_i|\mu(n, o^k)\Big) \right] P\Big(o^k|s_i\Big) = \bar{c}_i(s_i). \tag{3}$$

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 o_i, o'_i, and every profile of outcomes for the other players o_{-i},

$$\mu(o_i, o_{-i}) = \mu(o'_i, o_{-i}).$$

This implies that for every pair of outcomes for player i o_i, o_i', and for every profile of outcomes for the other players o_{-i},

$$P\Big(d = \delta_i | \mu(o_i, o_{-i})\Big) - P\Big(d = \delta_i | \mu(o_i', o_{-i})\Big).$$

From this, it follows that the left hand side of equation 3 is equal to 0, which establishes the result.

A.3 Empirically Assessing Influence

Proof of Lemma 2

The result follows from application of Bayes rule and the fact that in a cut-point filing equilibrium, for a group biased in favor of d_1, $\bar{c}_i(0) < \bar{c}_i(1)$.

Proof of Lemma 3

The the group has strictly positive influence if $v > 0$ follows from lemma 1.

Next, suppose that $v_i = 0$. We will show that, in any cutpoint equilibrium, $v_i = 0$ implies that $\bar{c}_i(0) < \bar{c}_i(1)$. For a contradiction, suppose not. That is, $\bar{c}_i(s_j) > 0$ for some signal s_j. In equilibrium, it must be the case that $U_i(f|s_j) - U_i(n|s_j) = \bar{c}_i(s_j)$. Because $v_i = 0$, $U_i(f|s_j) - U_i(n|s_j) = 0$, which implies that $\bar{c}_i(s_j) = 0$, a contradiction.

Proof of Proposition 4

Recall that groups never file when a case is not relevant. This implies that in expectation, the first term in $\hat{I}$ is a consistent estimate of $Pr(d = d_1|f_i, i \in R)$. To calculate influence we also wish to estimate $Pr(d = d_1|n, i \in R)$. However, if both relevant and irrelevant cases are pooled, taking the mean outcome when a group does not file results in an estimate that is in expectation equal to $Pr(i \in R)Pr(d = d_1|n, i \in R) + Pr(i \in I)Pr(d = d_1|n, i \in I)$. Note that, because the judge does not update after observing a non-filing when a case is irrelevant to a group's interests, $Pr(d = d_1|n, i \in R) < Pr(d = d_1|n, i \in I)$, which establishes the result.

A.4 Endogenous Auditing

First, we establish existence of a cut-point equilibrium in the model with endogenous auditing. We use an argument similar to the one used to establish equilibrium existence in the baseline model, constructing a mapping that represents the group's and the judge's indifference conditions for filing and auditing, respectively. Verifying continuity of this mapping delivers existence via Brouwer's fixed point theorem.

Assume that the group uses a cut-point strategy when deciding whether to file or not. Given this cutpoint strategy, we define notation for the judge's beliefs, obtained via Bayes rule, so that μ_o denotes the Judge's belief after outcome o. More specifically, let

$$\mu_1 = \frac{\pi_i q}{\pi_i q + (1-\pi_i)(1-q)}$$

denote the judge's belief if she audits and learns that the group's signal is equal to 1. Similarly, let

$$\mu_0 = \frac{\pi_i(1-q)}{\pi_i(1-q) + (1-\pi_i)q}$$

be the judge's belief if she audits and learns that the group's signal is equal to 0. If the judge does not audit and the group files playing a cut-point strategy, then the judge's belief is equal to

$$\mu_f = \frac{q\Big(\pi_i G(\bar{c}_i(1)) + (1-\pi_i)G(\bar{c}_i(0))\Big)}{q\Big(\pi_i G(\bar{c}_i(1)) + (1-\pi_i)G(\bar{c}_i(0)\Big) + (1-q)\Big(\pi_i G(\bar{c}_i(0)) + (1-\pi_i)G(\bar{c}_i(1)\Big)}.$$

Finally, if the group does not file when the group uses a cut-point strategy, the judge's belief is equal to

$$\mu_n = \frac{q\Big(\pi_i G(\bar{c}_i(1)) + (1-\pi_i)G(\bar{c}_i(0))\Big)}{q\Big(\pi_i(1-G(\bar{c}_i(1))) + (1-\pi_i)(1-G(\bar{c}_i(0)))\Big) + (1-q)\Big(\pi_i(1-G(\bar{c}_i(0))) + (1-\pi_i)(1-G(\bar{c}_i(1)))\Big)}.$$

Next, recall that, given belief μ_o, the judge will choose decision d_1 if the shock is above cutpoint $\bar{\epsilon}_o$, which itself is a function of μ_0 as described earlier. The judge's expected utility for not auditing, given that the group files is given by

$$U_J(N|f_j) = \Big(\frac{\bar{\epsilon}_{f_j}+1}{2}\Big)\Big(\mu_{f_j} + \beta + \frac{\bar{\epsilon}_{f_j}+1}{2}\Big) + \Big(\frac{1-\bar{\epsilon}_{f_j}}{2}\Big)\Big(1-\mu_{f_j}\Big).$$

The judge's expected utility for auditing is

$$U_J(A|f_j) =$$

$$\mu_{f_j}\left[\Big(\frac{\overline{\epsilon}_1+1}{2}\Big)\Big(\mu_1+\beta+\frac{\overline{\epsilon}_1+1}{2}\Big)+\Big(\frac{1-\overline{\epsilon}_1}{2}\Big)\Big(1-\mu_1\Big)\right]+$$

$$(1-\mu_{f_j})\left[\Big(\frac{\overline{\epsilon}_0+1}{2}\Big)\Big(\mu_0+\beta+\frac{\overline{\epsilon}_0+1}{2}\Big)+\Big(\frac{1-\overline{\epsilon}_0}{2}\Big)\Big(1-\mu_0\Big)\right]-c_J.$$

Comparing expected utilities yields that after seeing the group file in favor of decision j the judge audits if her cost is below some cut-point $\overline{c}(j)$ and does not audit if her cost is above this cut-point. Note that because the group's costs are continuously distributed, the judge's utility for auditing and not auditing are each continuous in the group's cut-points $\overline{c}(0)$ and $\overline{c}(1)$.

Next, consider the group's utility. Using a notation similar to before, let $P^\sigma(f_j)$ be the probability that the judge implements decision d_1, given that the judge's auditing cutpoints are $\overline{c}_J(0)$ and $\overline{c}_J(1)$ when the group offers filing f_j and has received signal s_i. This probability is

$$P^\sigma_J(f_j) = \left[G_J(\overline{c}_J(f_j))P\Big(d=d_1|\mu_{s_i}\Big)+\Big(1-G_J(\overline{c}_J(f_j))\Big)P\Big(d=d_1|\mu_{f_j}\Big)\right].$$

With this, we substitute $P^\sigma_J(f_j)$, into the group indifference conditions from the proof of proposition 1, replacing $P^\sigma_0(f_j)$. Because $P^\sigma_J(f_j)$ is continuous in the vector of auditing and filing cutpoints $\overline{c}$, the same argument from Proposition 1 delivers a fixed point via Brouwer's theorem, ensuring existence of a cut-point equilibrium.

Proof of Proposition 5

The first statement in part 1 follows from the characterization of cut-point equilibrium with endogenous auditing. To establish the second statement, note that when the judge is unable to audit, the model is equivalent to the baseline model where $p_i = 0$. Proposition 3 implies that influence is 0 in this case, which establishes the result.

Now, we prove part 2. We show that a group's influence is the same under both strategic auditing and no auditing. To establish the result, we demonstrate that the judge never audits a moderate group in equilibrium.

To deduce a contradiction, suppose not. That is, suppose that the judge faces a filing from a moderate group, and the judge audits for some positive cost $c_J > 0$. Note that by definition of the moderate group's strategy, the judge knows the group's signal with certainty, conditional upon observing them file. This implies that $U_J(A) < U_J(N)$, contradicting the assumption that the judge audits for some $c_J > 0$. Therefore, the judge never audits a moderate group with positive probability, which implies the result.

Example: Targeting a high quality group

Consider $N = 2$ with both groups being biased and $\pi_1 = 1 > \pi_2$. If only group 1 files then re-using our earlier analyses and replacing $\mu_J(f_j)$ with $\mu_J(f_j, n)$ yields an $\overline{c}_J(f_j, n)$ that is continuous in the groups' cut-points such that the judge audits group 1 if her costs is. Similarly we obtain $\overline{c}_J(n, f_j)$ for group 2. Thus, we obtain

$$P_J^\sigma(f_j, n) = \Bigg[G_J(\overline{c}_J(f_j, n))P\Big(d = d_1|\mu_J(s_i, n)\Big) + \Big(1 - G_J(\overline{c}_J(f_j, n))\Big)P\Big(d = d_1|\mu(f_j, n)\Big)\Bigg],$$

$$P_J^\sigma(n, f_j) = \Bigg[G_J(\overline{c}_J(n, f_j))P\Big(d = d_1|\mu(n, s_i)\Big) + \Big(1 - G_J(\overline{c}_J(n, f_j))\Big)P\Big(d = d_1|\mu(n, f_j)\Big)\Bigg].$$

Moving on from the outcomes where only one group files, now consider if both file. Clearly if the judge is going to audit there is no reason to ever audit the lower quality group over the high quality group, as auditing the high quality group reveals the correct state for sure. Thus, in a cut-point equilibrium the judge will target the high quality group if both groups audit and to complete our analysis we just need to show that a cut-point equilibrium indeed exists. Therefore, if both groups file we only need to find when the judge prefers to audit group 1 over not auditing at all. In this case, her expected utility for auditing is given by

$$U_J(N|f_{\delta_1}, f_{\delta_2}) = \Big(\frac{\overline{\epsilon}(f_{\delta_1}, f_{\delta_2}) + 1}{2}\Big)\Big(\mu_J(f_{\delta_1}, f_{\delta_2}) + \beta + \frac{\overline{\epsilon}(f_{\delta_1}, f_{\delta_2}) + 1}{2}\Big) + \Big(\frac{1 - \overline{\epsilon}(f_{\delta_1}, f_{\delta_2})}{2}\Big)\Big(1 - \mu_J(f_{\delta_1}, f_{\delta_2})\Big).$$

On the other hand, the judge's expected utility for auditing group 1 is

$$\begin{aligned} U_J(A|f_{\delta_1}, f_{\delta_2}) =& \mu_J(f_{\delta_1}, f_{\delta_2})\Bigg[\Big(\frac{\overline{\epsilon}(1) + 1}{2}\Big)\Big(1 + \beta + \frac{\overline{\epsilon}(1) + 1}{2}\Big)\Bigg] + \\ & (1 - \mu_J(f_{\delta_1}, f_{\delta_2}))\Bigg[\Big(\frac{\overline{\epsilon}(0) + 1}{2}\Big)\Big(\beta + \frac{\overline{\epsilon}(0) + 1}{2}\Big) + \Big(\frac{1 - \overline{\epsilon}(0)}{2}\Big)\Bigg] - c_J. \end{aligned}$$

Thus, we get that there is an $\overline{c}_J(f, f)$ such that if $c_J \leq \overline{c}_J(f, f)$ then the judge audits group 1, otherwise she does not audit either group. Furthermore, as the judge's belief is continuous in the cut-points $\hat{c}_i(1)$ and $\hat{c}_i(0)$ for $i \in \{1, 2\}$ we get that $\overline{c}_J$ is continuous in the groups' cut-points. Using this, we get

$$P_J^{\sigma}(f_{\delta_1}, f_{\delta_2}) = \Bigg[G_J(\bar{c}_J(f_{\delta_1}, f_{\delta_2}))P\Big(d = d_1|\mu_J = 1\Big) + \Big(1 - G_J(\bar{c}_J(f_{\delta_1}, f_{\delta_2}))\Big)P\Big(d = d_1|\mu(f_{\delta_1}, f_{\delta_2})\Big)\Bigg]$$

Substituting the new P_J^{σ}s into our original equilibrium equations yields existence of cut-point equilibrium.

Example: Targeting a biased group

Now consider the case where $N = 2$ and assume group 1 is in favor of d_1 and group 2 is moderate. Given a cut-point equilibrium, if the judge observes group 2 file in favor of decision d_j then the judge updates that $s_2 = j$. Thus, it is not optimal for the judge to pay a cost to audit group 2. If group 1 files then the judge's decision to audit following (f, n) and (f, f) can be described using equations similar to the previous case, which yields

$$P_J^{\sigma}(f_j, n) = \Bigg[G_J(\bar{c}_J(f_j, n))P\Big(d = d_1|\mu_J(s_i, n)\Big) + \Big(1 - G_J(\bar{c}_J(f_j, n))\Big)P\Big(d = d_1|\mu(f_j, n)\Big)\Bigg],$$

$$P_J^{\sigma}(f_{\delta_1}, f_{\delta_2}) = \Bigg[G_J(\bar{c}_J(f_{\delta_1}, f_{\delta_2}))P\Big(d = d_1|\mu_J(s_1, f_j)\Big) + \Big(1 - G_J(\bar{c}_J(f_{\delta_1}, f_{\delta_2}))\Big)P\Big(d = d_1|\mu(f_{\delta_1}, f_{\delta_2})\Big)\Bigg].$$

Substituting these in for group 1 in the original existence argument and setting $p_2 = 0$ for group 2 delivers existence of cut-point equilibrium in this model.

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