Search, Bargaining, and Signaling in the Market for Legal Services

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ABSTRACT

Over the last eight centuries, lawyers in common law countries have generally been precluded from buying their clients' cases. Recently a number of economists and lawyers have argued that sale should be allowed so as to eliminate moral hazard, particularly when contingent fees are used; this argument is based on full-information reasoning. However, if the lawyer has private information about the case value, then compensation demands potentially signal this value when the client can search over lawyers. We provide a formal model and a family of computational examples that show that allowing (possibly partial) purchase can reduce expected social efficiency.

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1. Introduction

A classic concern in the theory of asymmetrically-informed trade is the purchase of a good by a less-informed buyer from a more-informed seller, especially when the buyer relies upon the expertise of the seller to provide information about the value of the good. We consider this problem in the context of a client (she has been harmed, but is comparatively ignorant about the value of a potential lawsuit) hiring a lawyer. Complicating the adverse selection issue is that the lawyer, after contracting based on his superior information about the its value, chooses the level of nonverifiable effort to take in pursuing the case at trial. Thus, the value to the buyer and the seller depends on a post-contracting investment choice by the seller, leading to moral hazard. We find that adverse selection can exacerbate the moral hazard problem sufficiently so that, at least in some circumstances, allowing the lawyer to acquire the case from the client (the usual intuition for resolving moral hazard problems) actually lowers, rather than raises, expected welfare.

This issue is of more than purely theoretical concern. Trade in tort claims is currently prohibited in most jurisdictions, but this is changing. For many years most jurisdictions in the U.S. have allowed lawyers to take a fraction of any winnings in a tort lawsuit (a "contingent fee" which tends to be one-third), based on the lawyer's commitment to cover the costs (because clients are very often wealth-constrained). Historically (reaching back over many centuries of common law) lawyers cannot purchase a case outright by making a payment to the client. In some countries (e.g., Australia, the U.K. and, increasingly, the U.S.), third parties may engage in "litigation funding" wherein the funding party advances money to a plaintiff or to a law firm in exchange for a claim on the eventual recovery. Theoretically, there are efficiency gains from transferring a claim to an informed expert, as moral hazard problems associated with motivating appropriate effort by the lawyer are resolved. But there is also reason for concern if the party purchasing the claim has market power and/or private information regarding its value, both of which seem plausible in regard to tort claims. Thus, the basic policy issue concerns relaxing the constraints on transferring (full or partial) ownership of a legal claim, particularly when the expertise about the value of the claim lies with the acquiring party: there is the very real potential that an informed lawyer with some market power could defraud an uninformed client.

Despite this often-voiced concern, previous analytical models that consider the determination of contingent fees (with or without any *ex ante* transfers) assume that the market for legal services is perfectly competitive. As a consequence, lawyers try to attract clients by offering compensation demands that will appeal to the clients, rather than trying to fleece them. Although we believe that competition for clients plays an important role, we provide a model in which active search by the client is necessary in order to bring this competition about. We use the magnitude of the client's search cost as an index of lawyers' market power.

We also consider the possibility that lawyers have pre-contracting[1] asymmetric information (hereafter: PAI). Upon conferring with the client, the lawyer learns the expected value of the case (the actual value is realized at trial), but this information cannot be credibly conveyed to the client. Rather, the lawyer quotes a compensation demand which consists of a contingent fee and (if permitted) a transfer. The client observes this demand, draws any possible inferences regarding the expected value of her case, and decides whether to accept it or to seek a second option by paying the search cost again. If she seeks a second option, the second lawyer will also learn the expected value of her case (and it is assumed to be the same because it is a case attribute and both lawyers are experts). We assume that, having consulted two lawyers, the client can induce them to "bid" for her case. That is, the client can induce the lawyers to compete, but she has to consult both of them (expending the search cost twice) to induce this shift in bargaining power.

We find that, in equilibrium, the contingent fee alone – or in concert with a transfer – can serve as a signal to the client about the expected value of the case. Although the lawyer always prefers a higher contingent fee (and lower transfer payment to the client, when permitted) if this would be accepted, the client responds to less favorable compensation demands with a higher probability of a second search. This restrains the lawyer's temptation to extract surplus from the client to quite a substantial degree.

When the lawyer can buy part or all of the case, then the equilibrium contingent fee is an <u>increasing</u> function of the expected case value. A lawyer with a high-value case has an incentive to masquerade as one with a low-value case, so a lawyer with a low-value case distorts his contingent fee demand down from his (pre-contracting) full information demand (hereafter: PFI), which would involve full purchase. Moreover, a demand suggesting that the case is low-valued is met with a positive probability of rejection by the client. Thus, both the client and the lawyer-type with a low-value case act to discourage mimicry by the lawyer-type with a high-value case. On the other hand, when transfers are not possible (e.g., because the client is financially-constrained and the lawyer is prohibited from paying the client), the equilibrium contingent fee quoted by the first lawyer is decreasing in the expected case value (this is consistent with recent empirical evidence in class action settlements; see Eisenberg and Miller, 2010). Although the equilibrium contingent-fee demand is the same as under PFI (so the low-type lawyer does not distort his compensation demand away from its PFI value), it is now rejected with positive probability in favor of a second search (leading to competition). Thus, in both cases, the client's mixed-strategy response induces separation in equilibrium, and results in lower expected equilibrium profits for lawyers.

Because the contingent fee also motivates the lawyer's effort, this has implications for how efficiently the case is ultimately pursued (where efficiency here involves only the joint payoff of the client and her lawyer). With no transfers, the equilibrium contingent fee demanded by the first lawyer approached is higher than the client's preferred fee. Under PAI, client search sometimes occurs in equilibrium, leading to a "bidding down" of the contingent fee; thus PAI results in lower lawyer effort (on average). In contrast, when transfers (from lawyer to client) are also allowed, then PAI results in a downward-distorted contingent fee demanded by the first lawyer and, if accepted, lower lawyer effort than would occur under PFI. Search for a second option in this setting, however, results in an outright sale of the case to the second lawyer and thus efficient effort is taken in equilibrium. Therefore, the two alternative contract forms generate substantially different pricing of legal services and potentially different results with respect to the extent of moral hazard.

We find that clients are always worse off when lawyers have more market power (i.e., when search costs are higher). Independent of the information structure, when transfers are allowed then welfare is decreasing in the level of search costs, but when transfers are not allowed then an increase in search costs can increase overall welfare, at least when the search cost is sufficiently small. The latter, seemingly perverse, finding is due to the fact that higher search costs lead to higher contingent fees which lead to more efficient conduct of the case at trial. Welfare is improved by allowing transfers when the expected value of the case is common knowledge, but we show by example that when the lawyer has private information about the expected value of the case, then allowing transfers can lower *ex ante* expected welfare.

Plan of the article. In Section 2 we review related literature; Section 3 provides notation and describes the continuation game in which the lawyer chooses his effort level at trial. Section 4 provides the analysis when lawyers may demand a combination of a contingent fee and a transfer, and Section 5 conducts the corresponding analysis for the prevailing system wherein lawyers receive only a contingent fee. Section 6 discusses the effect on welfare of changes in the search costs and allowing lawyers to buy (all or part of) a client's case. Section 7 provides a discussion of the results and possible extensions. An Appendix provides some details of the analysis; a separate Technical Appendix[2] provides additional supporting arguments and further results.

2. Related literature

Our model involves search, bargaining, and moral hazard, in an environment of PAI. An important aspect of the model is that neither party is fully-empowered to set the terms of the lawyer's compensation; rather, bargaining power switches endogenously as a consequence of the client's search behavior.[3] Macey and Miller (1991) argue that auctions should be used to select the attorney for large-scale small-value class actions, with the best alternative (assuming a competitive market) being to sell the entire case to the highest bidder;[4] Shukaitis (1987) makes a similar argument for personal injury claims. Polinsky and Rubinfeld (2003) propose a decentralized scheme with a zero-profit "administrator" who agrees to reimburse the lawyer for the complement of the contingent fee share of the litigation costs in exchange for a fixed payment. This scheme, which relies on common knowledge and competition, achieves efficient effort choice by lawyers.

Some of the previous related analytical literature has focused on the determination of the contingent fee, assuming no transfers, under PFI. Standard results are that competition will not lead to extremely low contingent fees because clients recognize that the contingent fee incentivizes the lawyer's effort when effort is non-contractible (see, e.g., Hay 1996 and 1997; see also Santore and Viard, 2001, who argue that constraints on lawyers making transfers to clients act to preserve lawyers' rents);[5] and that the competitively-determined contingent fee is a decreasing function of the anticipated award (Hay, 1996).

Two previous articles consider both a contingent fee and a transfer when one party has private information about the value of the case. Dana and Spier (1993) assume that lawyers compete for clients by offering contracts prior to the lawyers' receipt of private information about the value of the case (whereupon the lawyer decides whether to drop or pursue the case). They find that a contract consisting of a contingent fee and a transfer induces the lawyer to make the jointly-optimal decision; they also characterize the optimal contingent fee when the transfer is constrained to be zero. Rubinfeld and Scotchmer (1993) consider a competitive screening model wherein a client is assumed to be better-informed than lawyers about the expected award. Uninformed lawyers offer a menu of contracts to the informed client. They find that the equilibrium contingent fee is 1 (that is, the lawyer purchases the entire case) when the expected award is low. However, in order to sort the client types, a client who claims to have a high-value case cannot receive the same favorable treatment; rather, the contingent fee for high-value cases is (typically) less than 1.

Our model differs from all of the aforementioned models of the fee structure by allowing imperfect competition among lawyers. Bargaining power shifts endogenously between the lawyer and the client due to client search. Unlike Dana and Spier (1993), in our model the timing of the receipt of private information allows for information transmission. Unlike Rubinfeld and Scotchmer (1993), we assume that the lawyer[6] (rather than the client) has private information about the case value and we provide a signaling (rather than a screening) model. A transfer is crucial in a screening model,as the contingent fee alone cannot sort the lawyer types (all types prefer higher contingent fees). In our model, the contingent fee alone can signal the expected value of the case because the client's search decision is a second "instrument" in lieu of a transfer.

3. Model Setup

A harmed client has decided to sue for damages. Let A denote the expected award at trial (conditional on winning), where $A \in \{\underline{A}, \bar{A}\}$, with $0 < \underline{A} < \bar{A} < \infty$. In the continuation game, the lawyer who contracts with the client chooses trial effort based on the expected award, A; the realized award does not reveal the lawyer's effort, thereby allowing for moral hazard.[7] Trial results in one of two outcomes: winning or losing, wherein winning results in a realized award that is verifiable and can be viewed as a random variable drawn from a distribution with support $[0, \infty)$ and whose mean is either $\underline{A}$ or $\bar{A}$. Let $H \in (0, 1)$ denote the probability that the expected case value is "high," that is, $H \equiv \Pr\{A = \bar{A}\}$. In the subsequent sections, we first analyze the relevant problem under PFI regarding A, meaning that A is common knowledge to both the client and all lawyers that the client visits. We next consider the case wherein the lawyer has private information about the value of A. All other attributes of the model are common knowledge between the client and the lawyer(s), though the effort of any lawyer who ends up taking the case is not verifiable. Formally, our analysis under PAI involves adverse selection with moral hazard in the continuation game.

When a client visits a lawyer the client incurs a cost $s > 0$, which represents the cost of locating a qualified lawyer (e.g., one with expertise in the relevant area of law), foregoing other uses of the client's time, and documenting and expressing the details of the case (which might impose a disutility on the client as well as a monetary expense); moreover, this cost might also reflect a "consultation fee" that is demanded by the lawyer for him to spend his time listening to the case.[8] This search cost is an important friction, providing the lawyer with some degree of market (or hold-up) power;[9] the higher the search cost the less willing the client will be to seek a second option, and thus the greater the market power of the first lawyer visited. The search cost (expended for each new lawyer that the client visits) only applies to visiting a lawyer for the first time: returning to a previously-visited lawyer is costless.

Note that the search cost at the second lawyer might be lower (but still positive), as the client might become more efficient in expressing the details of the case. Although the client has a quote from the first lawyer that indicates his demand for compensation for handling the case, the second lawyer must still engage in (costly) due diligence to verify (for himself) the case's value, so a consultation is still required reflecting the second lawyer's effort to confirm the details of the case. A lawyer that simply relied on a previous lawyer's quote could be defrauded by a client-lawyer pair that manufactures a trivial case to sell to the gullible lawyer. For simplicity we will use the same search cost, s, for every initial visit to a lawyer.

Should a lawyer take the case, his effort at trial is denoted as $x \geq 0$ and his likelihood of winning at trial (given effort level x) is denoted as $p(x)$; we do not consider the possibility of settlement bargaining in the model. We make the following assumptions about the twice continuously differentiable function $p(x)$.

Assumption 1. $p'(x) > 0$ and $p''(x) < 0$ for $x \geq 0$; $p(0) = 0$; and $\lim_{x\to\infty} p(x) = 1$. Moreover, assume that $\lim_{x\to 0} p'(x) = \infty$ and $\lim_{x\to\infty} p'(x) = 0$.

This assumption means that the probability of winning at trial is increasing (at a decreasing rate) in effort, and at zero effort this probability is zero. The portions of the assumption that address limits of the function or its derivative simply guarantee that the function acts like a probability ($p(x) < 1$ for all finite values of x) and that it will always be optimal to put in some effort, but that optimal effort will be finite in level.

All qualified lawyers are homogeneous in terms of talent and costs of operation. For simplicity we take the lawyer's per-unit cost of effort to be 1, so that the lawyer's effort costs are expressed as x. After hearing the details of a case, a lawyer announces a compensation pair (α, F) that he demands for taking the case, where α is the contingent fee (the fraction of the realized award at trial if the lawyer wins) and F is a transfer between the lawyer and the client. Assume that $0 \leq \alpha \leq 1$ and that F can be positive, zero, or negative; because most tort clients are wealth-constrained, it is most plausible for F to be non-negative and when transfers are allowed F is positive in equilibrium because lawyers compete (to some extent) for the client's case. Thus, for example, a demand (1, F) with F positive would be a demand by the lawyer to buy the case from the client at price F, whereas a demand of (.333, 0) indicates that the lawyer receives one-third of the award and no flat fee is paid or received by the lawyer.[10]

The effort-level continuation game and the overall game. We first describe the effort-level continuation game which is common to all the analyses to come. Assume a lawyer and a client have agreed to a contract that specifies a contingent fee and a transfer (which might be zero); assume that the lawyer's effort x is not contractible. For any given value of A and any demand (α, F), let $\Pi^L(\alpha, A)$ denote the lawyer's anticipated payoff from conducting the trial (ignoring the transfer F). After agreeing to a contract, the plaintiff's lawyer chooses x to maximize $\alpha Ap(x) - x$. Under Assumption 1, there is a unique maximizer, denoted $x^L(\alpha, A)$, at which $\alpha Ap'(x) - 1 = 0$ and $\alpha Ap''(x) < 0$. As long as $\alpha > 0$, optimal effort $x^L(\alpha, A) > 0$; however, should $\alpha = 0$, then $x^L(0, A) = 0$. Let $p^L(\alpha, A) \equiv p(x^L(\alpha, A))$ and let $p_1^L(\alpha, A) \equiv p'(x^L(\alpha, A))x_1^L$ be the partial derivative of p^L with respect to α. Similarly, let $p_2^L(\alpha, A) \equiv p'(x^L(\alpha, A))x_2^L$ be the partial derivative of p^L with respect to A. It is straightforward to see that p_1^L, p_2^L, x_1^L, and x_2^L are all positive for $\alpha > 0$. Thus, $\Pi^L(\alpha, A) \equiv \alpha Ap^L(\alpha, A) - x^L(\alpha, A)$; under the maintained assumptions, $\Pi^L(\alpha, A)$, Π_1^L, Π_2^L, and Π_{12}^L are all strictly positive for all $\alpha > 0$.

Let $\Pi^C(\alpha, A) = (1 - \alpha)Ap^L(\alpha, A)$ be the client's expected payoff from trial if the expected award, A, is common knowledge and the lawyer chooses his effort based on his demand (α, F). Notice that $\Pi^C(0, A) = 0 = \Pi^C(1, A)$; these equalities follow from the facts that the lawyer puts in no effort if $\alpha = 0$ and the client gets no share of the award if $\alpha = 1$. It is worth summarizing some assumed features of the client's reduced-form payoff function, $\Pi^C(\alpha, A)$, before proceeding further. The following assumption ensures that there is a unique interior contingent fee that is most-preferred by the client.[11]

Assumption 2. $\Pi^C(\alpha, A)$ is increasing, and then decreasing, in α for every A. Moreover, for each value of A, assume that: (1) $\Pi^C(\alpha, A)$ is twice differentiable and (2) $\Pi_{11}^C < 0$ at the peak.

Thus, there exists a unique value of $\alpha \in (0, 1)$, denoted $\alpha^C(A)$, that maximizes the client's (partial) payoff $\Pi^C(\alpha, A)$. It is defined by the first-order condition:

$\Pi^C_1(\alpha, A) = -Ap^L(\alpha, A) + (1 - \alpha)Ap^L_1(\alpha, A) = 0.$

The only source of conflict between the client and the lawyer concerning the setting of α would occur in the range of $\alpha \geq \alpha^C(A)$, because if $\alpha < \alpha^C(A)$, both parties would find it mutually beneficial to increase the value of α: the lawyer always would desire a higher value of α and the client knows that a value of $\alpha < \alpha^C(A)$ will elicit too little effort on the part of the lawyer. Differentiating $\Pi^C_1(\alpha, A)$ and collecting terms provides the result that $d\alpha^C(A)/dA = - \Pi^C_{12}/ \Pi^C_{11}$, where both expressions on the right-hand-side are evaluated at $(\alpha^C(A), A)$. Because $\Pi^C_{11}(\alpha^C(A), A) < 0$, we have $\text{sgn}\{d\alpha^C(A)/dA\} = \text{sgn}\{\Pi^C_{12}(\alpha^C(A), A)\}$. We make the following assumption about this expression.

Assumption 3. $\Pi^C_{12}(\alpha, A) < 0$ for $\alpha > \alpha^C(A)$, and $\Pi^C_{12}(\alpha, A) \leq 0$ for $\alpha = \alpha^C(A)$.

Since the lawyer's incentives to work on the case are strengthened by an increase in either α or A, then Assumption 3 implies that $d\alpha^C(A)/dA \leq 0$; that is, as A increases the client would prefer to reduce (or leave unchanged) the contingent fee α. Thus, at the client's optimum the lawyer will get a lower share if the expected award is higher.

We have made this assumption because we are unable to prove this property for $\Pi^C_{12}(\alpha, A)$ for general $p(\bullet)$ functions (see footnote 11). However, we have considered three fairly classic and commonly-used functional forms for $p(\bullet)$: (1) $p(x) = \lambda x^\theta$, where $0 < \theta < 1$ and $\lambda > 0$; (2) $p(x) = x/(x + 1)$; and (3) $p(x) = 1 - \exp(-\lambda x)$, where $\lambda > 0$. In all three cases, $\Pi^C(\alpha, A)$ satisfies Assumptions 2 and 3.

Assumptions 2 and 3 place restrictions on the equilibrium continuation payoffs rather than on the underlying exogenous function $p(x)$. Although an assumption such as $p'''(x) \leq 0$ would imply the content of Assumption 2, it would not imply the content of Assumptions 3, 5 and 6. In addition, it would exclude many very plausible versions of the $p(x)$ function, such as forms (1)-(3) above, all of which can be shown to satisfy Assumptions 2, 3, 5 and 6. The conditions in Assumption 1 involving limits are not all necessary; each of the examples (1)-(3) violates one or more of these conditions but one can simply use parameter restrictions to ensure interiority of effort.

Finally, note that the client's payoff (ignoring search costs) is $\Pi^C(\alpha, A) + F$ and the lawyer's payoff is $\Pi^L(\alpha, A) - F$. Two important properties of the combined payoff function are: (1) the combined payoff $\Pi^C(\alpha, A) + \Pi^L(\alpha, A)$ is maximized at $\alpha = 1$; and (2) even though the maximum occurs at the boundary where $\alpha = 1$, the first derivative is zero there: $\Pi^L_1(1, A) + \Pi^C_1(1, A) = 0$ (see the Appendix).

Sequence of moves in the overall game. We now specify the overall game to proceed as follows:

(1) The client, *C*, visits lawyer 1 (*L1*), to discuss the case, at a cost of *s*; *L1* learns *A*.
(2) *L1* makes a demand denoted as (α_1, F_1).
(3) If *C* accepts *L1*'s demand, then they contract at this demand and the game moves to the effort subgame discussed earlier.
(4) If *C* rejects *L1*'s demand, then *C* expends a search cost *s* in visiting and discussing the case with lawyer 2 (*L2*); *L2* learns *A* and (α_1, F_1).
(5) *L2* makes a demand denoted as (α_2, F_2).
(6) Having visited two lawyers, *C* may now choose either demand or costlessly auction the right of representation to *L1* and *L2* using a sealed-bid format, with the winner making the equilibrium demand denoted as (α^*, F^*). *C* chooses the best bid (based on her beliefs) and selects each lawyer with equal probability should they bid the same demand; this is followed by the effort subgame discussed earlier.

In this game, the lawyers cannot pre-commit to their compensation demands in order to avoid bidding for the right to represent the client, and the client cannot pre-commit to her search policy. Thus, the game involves the endogenously-chosen possibility of the transfer of bargaining power from the lawyers to the client if the client (initially the less-powerful player) is willing to incur the added search cost of consulting a second lawyer. This allows us to incorporate different levels of market power on the part of lawyers.

In the sequel we consider this game under PFI (*A* is known by clients and lawyers) and under PAI (*A* is private information known only by the lawyers).[12] We assume that when *C* visits *L2* and describes her case, she can also present the demand made by *L1*; thus, *C* cannot mislead an *L1* into thinking he is an *L2* (because he can demand proof, which she cannot provide if he really is *L1*). The client does not have an incentive to mislead an *L2* into thinking that he is an *L1*, as she does not expect the lawyers to have different information about her case, but is seeking a second option to improve her bargaining position.

It is notationally prohibitive to provide formal definitions of strategies and equilibrium at this point, but they are easily-described in words. A strategy for *L1* is a pair $(\alpha_1, F_1) \in [0, 1]\times[0, \infty)$ for each $A \in \{\underline{A}, \bar{A}\}$;

a strategy for C upon observing (α_1, F_1) is a probability $r(\alpha_1, F_1)$ of seeking a second option (where (α_1, F_1) influences C's payoff directly and also indirectly through her inferences about A) ; a strategy for $L2$ upon receiving a visit from C is a pair $(\alpha_2, F_2) \in [0, 1]\times[0, \infty)$ for each $A \in \{\underline{A}, \bar{A}\}$ and for each $(\alpha_1, F_1) \in [0, 1]\times[0, \infty)$. A strategy for C upon observing (α_1, F_1) and (α_2, F_2) is a probability of conducting an auction; and if an auction is conducted, a strategy for each lawyer is a bid that is contingent on A and all of the prior history. We will employ the concept of perfect Bayesian equilibrium, wherein each party at each decision node maximizes his or her expected continuation value (subject to the constraint that $F = 0$ when transfers are not allowed), taking account of how strategy choices may influence C's beliefs and the subsequent decisions of later-moving players. More specifically, we will characterize a separating equilibrium (that satisfies the D1 refinement), wherein $L1$'s compensation demand reveals the true expected case value A.[13]

In both the PFI and PAI environments we will encounter continuation games in which $L2$'s offer makes C indifferent between accepting $L2$'s demand and conducting the auction. If it is costless to conduct the auction, there are two continuation equilibria, one in which $L2$'s demand is accepted and one in which C runs the auction. In the Technical Appendix we show that, for any small positive cost of running the auction, $L2$ will have some residual market power and it will not be an equilibrium for C to run the auction when $L2$'s demand makes C indifferent. Thus, only in the limit, as the auction cost becomes zero, does the equilibrium wherein C runs the auction appear. Hence, we will assume the auction is costless for simplicity of exposition, and will consistently assume that when C is indifferent between accepting $L2$'s demand and conducting the auction, she accepts $L2$'s demand whenever this is consistent with equilibrium play.

4. Equilibrium analysis when *F* is unconstrained

In this section, arbitrary transfers are allowed; thus, demands by lawyers to represent a client are of the form (α, F). We start by considering the full-information game wherein the client also knows the value of A (the expected value of the case at trial). We then extend this analysis to incorporate private information on the part of the lawyers about the value of the client's case.

PFI equilibrium when *F* is unconstrained. We will solve the game backwards to ensure subgame perfection. In step (6) of the game, the client has expended a second search cost and obtained a second option. Because she can now conduct an auction costlessly, she can obtain a payoff of $\Pi^C(\alpha^*, A) + F^*$, where $(\alpha^*, F^*) = (1, \Pi^L(1, A))$. This holds as (in the auction) both lawyers would choose to bid the maximum amount to the client, which is obtained by first maximizing the profit from the case (i.e., setting $\alpha^*= 1$), and then offering the entire amount to the client (that is, setting $\Pi^L(1, A) - F^* = 0$). If the auction is held, then each lawyer bids the full profit from the case and obtains the right to the case with probability one-half. Alternatively, in step (5), *L2* could simply make the demand $(1, \Pi^L(1, A))$, which the client would accept in equilibrium.

Thus, if the client were to reject *L1*'s demand in step (4), and to expend s and get a second option, she would obtain a payoff of $\Pi^C(1, A) + F^* - s = \Pi^L(1, A) - s$, because $\Pi^C(1, A) = 0$. If she were to accept *L1*'s demand of (α_1, F_1) in step (3), the client would obtain a payoff of $\Pi^C(\alpha_1, A) + F_1$. Therefore, upon a visit from the client in step (2), *L1* optimally quotes a compensation demand (α_1, F_1) such that the client is just willing to accept it rather than visit *L2*. There are multiple such demands, all of which satisfy:

$$\Pi^C(\alpha_1, A) + F_1 = \Pi^L(1, A) - s. \qquad (1)$$

L1 chooses (α_1, F_1) to maximize $\Pi^L(\alpha_1, A) - F_1$ subject to equation (1); equivalently, *L1* chooses α_1 to maximize $\Pi^L(\alpha_1, A) + \Pi^C(\alpha_1, A) - \Pi^L(1, A) + s$. Only the first two terms depend on α_1, and the maximum is obtained at $\alpha_1 = 1$. Thus, the solution is $(\alpha_1, F_1) = (1, \Pi^L(1, A) - s)$. That is, after paying the cost *s* to visit *L1*, the client obtains (ignoring the first search cost) $\Pi^L(1, A) - s$ and *L1* obtains *s*; the client's overall payoff (including the cost of the first search) is $\Pi^L(1, A) - 2s$. We make the following assumption to ensure that the client enters the market for legal services even when her case has value, $\underline{A}$.

Assumption 4. $\Pi^L(1, \underline{A}) - 2s \geq 0$.

We summarize the equilibrium outcome when F is unconstrained and A is common knowledge as follows.

> *Proposition 1*. When A is common knowledge and Assumptions 1 and 4 hold, the equilibrium demand made by the first lawyer visited is $(1, \Pi^L(1, A) - s)$; there is no second search in equilibrium. In equilibrium, the client's overall payoff is $\Pi^L(1, A) - 2s$ and the first lawyer visited obtains s. Finally, the lawyer who obtains the case exerts the efficient level of effort.

PAI equilibrium when *F* is unconstrained. We now consider the problem when the lawyer is better informed about the expected value of the case than is the client. In particular, we assume that when the client visits a lawyer and describes her case, the lawyer privately learns the case's expected value A. When the lawyer demands (α, F) to represent the client, the client will draw an inference about A from the demand (and this will also be based on any prior history of demands).[14] Because we focus on a separating equilibrium, we assume that the beliefs associate a single value of A with any given demand (α, F).[15]

Again, we solve the problem "backwards," but this time we will be looking for a perfect Bayesian equilibrium due to the lawyers' pre-contracting private information. Thus, in the last stage, if the client conducts an auction, it is clear that an optimal decision rule is to simply accept the highest lump-sum payment bid by the lawyers. This will induce the lawyers to set $\alpha = 1$ to maximize the expected profit from the case, and then to bid this amount away in Bertrand fashion: the equilibrium bid is $F^* = \Pi^L(1, A)$.

Next, we specify the client's beliefs <u>after</u> having visited two lawyers and received two demands, in order to determine when C should conduct an auction (see the Technical Appendix for details). Suppose that $L1$ made a demand of (α_1, F_1); then if C visits $L2$, she arrives with beliefs, denoted as $B_1(\alpha_1, F_1)$. It will be useful to define the following curves: $u(B_1(\alpha_1, F_1)) = \{(\alpha_2, F_2) \mid F_2 = \Pi^L(1, B_1(\alpha_1, F_1)) - \Pi^C(\alpha_2, B_1(\alpha_1, F_1))\}$, for $B_1(\alpha_1, F_1) \in \{\underline{A}, \bar{A}\}$. The curve $u(B_1(\alpha_1, F_1))$ is the locus of pairs (α_2, F_2) that make C indifferent between accepting (α_2, F_2) and conducting the auction under the belief that the case has expected value $B_1(\alpha_1, F_1)$.

Let $B_2(\alpha_2, F_2 \mid B_1(\alpha_1, F_1))$ denote C's posterior belief, after having arrived at $L2$ with beliefs $B_1(\alpha_1, F_1)$ and having received the demand (α_2, F_2) from $L2$. We posit that:

$B_2(\alpha_2, F_2 \mid \underline{A}) = \underline{A}$ for $(\alpha_2, F_2) \in u(\underline{A})$; for all other (α_2, F_2), $B_2(\alpha_2, F_2 \mid \underline{A}) \in \{\underline{A}, \bar{A}\}$.

$B_2(\alpha_2, F_2 \mid \bar{A}) = \bar{A}$ for (α_2, F_2) between $u(\underline{A})$ and $u(\bar{A})$, inclusive of these boundaries; for all other

(α_2, F_2), $B_2(\alpha_2, F_2 \mid \bar{A}) \in \{\underline{A}, \bar{A}\}$.

The implications of these beliefs are as follows. If *C* approaches *L2* with the belief that $B_1(\alpha_1, F_1) = \underline{A}$ and if *L2* makes a demand along the curve $u(\underline{A})$, then *C* continues to believe that the expected case value is $\underline{A}$; in this case we say that *C*'s beliefs are "confirmed" by such a demand. For all other demands (α_2, F_2), *C* may believe that the expected value of the case is either $\underline{A}$ or $\bar{A}$. Beliefs are also confirmed if *C* approaches *L2* with the belief that $B_1(\alpha_1, F_1) = \bar{A}$ and if *L2* makes a demand that is on $u(\bar{A})$. For any demand by *L2* below $u(\bar{A})$ (but on or above the curve $u(\underline{A})$), *C* continues to believe that the expected case value is $\bar{A}$; that is, *C* will rationally hold skeptical beliefs about demands on the part of *L2* that are meant to persuade her that the expected value of her case is actually low when she currently believes it is high.[16]

We now summarize equilibrium behavior by *C* and *L2* in the continuation game. When *C* approaches *L2* with the belief that $B_1(\alpha_1, F_1) = \underline{A}$, an optimal strategy for *L2* (regardless of whether *L2* observed $\underline{A}$ or $\bar{A}$) is to confirm *C*'s belief by demanding $(\alpha_2, F_2) = (1, \Pi^L(1, \underline{A}))$. *C* accepts this demand and obtains a payoff of $\Pi^L(1, \underline{A})$; *L2* makes profits of zero if $A = \underline{A}$ and profits of $\Pi^L(1, \bar{A}) - \Pi^L(1, \underline{A}) > 0$ if $A = \bar{A}$. When *C* approaches *L2* with the belief that $B_1(\alpha_1, F_1) = \bar{A}$ and *L2* has observed $\bar{A}$, then an optimal strategy for *L2* is to confirm *C*'s belief by demanding $(\alpha_2, F_2) = (1, \Pi^L(1, \bar{A}))$. *C* accepts this demand and obtains a payoff of $\Pi^L(1, \bar{A})$; *L2* makes profits of zero. Finally, when *C* approaches *L2* with the belief that $B_1(\alpha_1, F_1) = \bar{A}$ but *L2* has observed $\underline{A}$, then an optimal strategy for *L2* is to provoke an auction by making a demand that *C* would reject (because any demand that *C* would accept lies on or above $u(\bar{A})$, yielding negative profits for *L2*). *C* will obtain the payoff $\Pi^L(1, \underline{A})$; *L2* makes profits of zero.

Now consider the interaction between *C* and *L1*. Let $B_1(\alpha_1, F_1) \in \{\underline{A}, \bar{A}\}$ denote the client's belief if the first lawyer visited demands (α_1, F_1); such a demand would yield a perceived payoff to the client (ignoring her initial search cost) of $\Pi^C(\alpha_1, B_1(\alpha_1, F_1)) + F_1$. Alternatively (as argued above), the client expects that she will ultimately obtain a payoff of $\Pi^L(1, B_1(\alpha_1, F_1))$ if she expends a second search cost s and visits a second lawyer. She will be indifferent between these alternatives if:

$$\Pi^C(\alpha_1, B_1(\alpha_1, F_1)) + F_1 = \Pi^L(1, B_1(\alpha_1, F_1)) - s. \tag{2}$$

It will be useful to define the following curves: $U(A) = \{(\alpha_1, F_1) \mid F_1 = \Pi^L(1, A) - s - \Pi^C(\alpha_1, A)\}$, for $A \in \{\underline{A}, \bar{A}\}$. The curve $U(A)$ is the locus of pairs (α_1, F_1) that make C indifferent between accepting (α_1, F_1) and searching again under the belief that the case has expected value A. Let $\varphi(\alpha, A) \equiv \Pi^L(1, A) - s - \Pi^C(\alpha, A)$, so that $(\alpha, \varphi(\alpha, A)) \in U(A)$. The expression $\varphi(\alpha, A)$ provides the transfer payment that must accompany a contingent fee of α in order to render C indifferent between accepting *L1*'s demand and searching again, when she believes the expected value of the case is A. A sufficient condition for the curves to not cross (and which is easily verified to hold for the three specific $p(x)$ functions introduced in Section 3) is the following.

Assumption 5: $\varphi(\alpha, A)$ is increasing in A for all $\alpha \in [0, 1]$.

For any value of A, $\Pi^L(1, A)$ is the value of the maximum joint (PFI) payoff to the lawyer and client, as the transfer F nets out and the resulting joint payoff, $\Pi^L(\alpha, A) + \Pi^C(\alpha, A)$, is maximized when $\alpha = 1$. Thus, $\Pi^L(1, A) - \Pi^C(\alpha, A) > 0$ for all α; Assumption 5 implies that this difference is increasing in A.

Beliefs that support a separating equilibrium in the game between *L1* and C are as follows. Along the curve $U(\underline{A})$, C believes that $A = \underline{A}$; that is, $B_1(\alpha, \varphi(\alpha, \underline{A})) = \underline{A}$ for all $\alpha \in [0, 1]$; and along the curve $U(\bar{A})$, C believes that $A = \bar{A}$; that is, $B_1(\alpha, \varphi(\alpha, \bar{A})) = \bar{A}$ for all $\alpha \in [0, 1]$. Because type $\bar{A}$ prefers to be taken to be $\underline{A}$, C is skeptical about demands (α, F) between the $U(\bar{A})$ and $U(\underline{A})$ curves, assigning them the belief $B_1(\alpha, F) = \bar{A}$. Finally, the client may hold arbitrary beliefs for demands strictly above $U(\bar{A})$ or strictly below $U(\underline{A})$.

Notice that, given these beliefs, C is indifferent between accepting a demand on $U(\bar{A})$ from *L1* and visiting *L2*, whereas she will accept with certainty a demand that lies above $U(\bar{A})$ (regardless of her beliefs). She is also indifferent between accepting a demand on $U(\underline{A})$ from *L1* and visiting *L2*, whereas she will reject with certainty a demand that lies below $U(\underline{A})$ (regardless of her beliefs). Finally, she will reject with certainty any demand from *L1* that lies strictly between $U(\underline{A})$ and $U(\bar{A})$ in favor of visiting *L2*.

In a separating equilibrium, the *L1* types must prefer to choose different demands; that is, $(\alpha_1{}^*(\underline{A}), F_1{}^*(\underline{A})) \neq (\alpha_1{}^*(\bar{A}), F_1{}^*(\bar{A}))$, meaning that at least one component must be different. The beliefs must also be consistent; that is, $B_1(\alpha_1{}^*(\underline{A}), F_1{}^*(\underline{A})) = \underline{A}$ and $B_1(\alpha_1{}^*(\bar{A}), F_1{}^*(\bar{A})) = \bar{A}$. The different types of *L1* will be induced to choose different demands in part by the likelihood with which *C* accepts the various demands.

First consider demands on the curve $U(\bar{A})$. Although *C* is indifferent between accepting such a demand from *L1* and visiting *L2* (given her belief that it comes from a lawyer of type $\bar{A}$), we argue that *C* accepts such demands in equilibrium.[17] Next consider demands on $U(\underline{A})$. Although *C* is indifferent between accepting such a demand from *L1* and visiting *L2* (given her belief that it comes from a lawyer of type $\underline{A}$), she may not be able to accept such demands for sure in a separating equilibrium, for this could induce mimicry by type $\bar{A}$; let $r(\alpha, F)$ be the probability that *C* rejects a demand by *L1* of (α, F) along $U(\underline{A})$. Finally, demands on the curve $U(\bar{A})$ or the curve $U(\underline{A})$ are the only ones that could occur in a separating equilibrium.[18]

Formally, the incentive compatibility conditions, denoted as IC($\bar{A}$) and IC($\underline{A}$), require that each type of lawyer is at least as well off by making a demand along its associated *U*-curve, rather than the best choice it can make along the other type's curve (thereby inducing the alternative belief by the client):

IC($\bar{A}$): $\max_{(\alpha, F) \in U(\bar{A})} \Pi^L(\alpha, \bar{A}) - F \geq \max_{(\alpha, F) \in U(\underline{A})} (1 - r(\alpha, F))(\Pi^L(\alpha, \bar{A}) - F)$;

IC($\underline{A}$): $\max_{(\alpha, F) \in U(\underline{A})} (1 - r(\alpha, F))(\Pi^L(\alpha, \underline{A}) - F) \geq \max_{(\alpha, F) \in U(\bar{A})} \Pi^L(\alpha, \underline{A}) - F$.

The left-hand-side of IC($\bar{A}$) reduces to finding the value of α that (after substituting in for $\varphi(\alpha, \bar{A})$) maximizes $\Pi^L(\alpha, \bar{A}) - \Pi^L(1, \bar{A}) + s + \Pi^C(\alpha, \bar{A})$. This maximum occurs at $\bar{\alpha}^* = 1$, so that the high type demands $(\bar{\alpha}^*, \varphi(\bar{\alpha}^*, \bar{A})) = (1, \Pi^L(1, \bar{A}) - s)$, yielding a profit to *L1* of s. Thus, IC($\bar{A}$) implies that:

$$s \geq (1 - r(\alpha, \varphi(\alpha, \underline{A})))(\Pi^L(\alpha, \bar{A}) - \varphi(\alpha, \underline{A})) \quad \forall \alpha \in [0, 1]. \tag{3}$$

That is, in order to keep the weak type ($\bar{A}$) from mimicking the strong type ($\underline{A}$), C must reject demands on the curve $U(\underline{A})$ with sufficient frequency ($r(\alpha, \varphi(\alpha, \underline{A}))$) so as to make mimicry unprofitable for the weak type. Notice that not all α-values on $U(\underline{A})$ require a positive probability of rejection, but this is required for $\alpha = 1$ (the weak type's optimal contingent fee).

In a similar manner, IC($\underline{A}$) can be re-expressed as:

$$\max_\alpha (1 - r(\alpha, \varphi(\alpha, \underline{A})))(\Pi^L(\alpha, \underline{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\alpha, \underline{A}))$$

$$\geq \Pi^L(\alpha, \underline{A}) - \Pi^L(1, \bar{A}) + s + \Pi^C(\alpha, \bar{A}) \quad \forall \alpha \in [0, 1].$$

In the Appendix we show that, in a separating equilibrium, IC($\underline{A}$) is slack as long as s is not too large (we denote the upper bound on s as $\hat{s}$). Thus, the economic intuition is that when search costs are not too large the strong type does not have an incentive to mimic the weak type.

Combining these two results provides a set of possible rejection functions for the client, each of which (with the beliefs as specified earlier) supports a separating equilibrium. Figure 1 illustrates this set of functions, expressed in terms of the probability of acceptance, $1 - r$. Note that any selection (that is, a function selected so that its graph is entirely in the region of interest) will satisfy the IC constraints, but the

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Please place Figure 1 about here

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function represented by the upper boundary of the set will provide the one that yields separation with the least amount of rejection (search).[19] This selected rejection function is most-preferred by the $\underline{A}$-type lawyer; both the client and the $\bar{A}$-type lawyer are indifferent, making this selection the unique Pareto optimal rejection function. It is found by taking equation (3) to be an equality which, upon solving, yields:

$$(1 - r(\alpha, \varphi(\alpha, \underline{A})) = s/(\Pi^L(\alpha, \bar{A}) - \varphi(\alpha, \underline{A})) = s/(\Pi^L(\alpha, \bar{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\alpha, \underline{A})). \quad (4)$$

Using this on the left-hand-side of IC($\underline{A}$) and solving the optimization problem thereby provides the $\underline{A}$-type's demand ($\underline{\alpha}^*$, $\varphi(\underline{\alpha}^*, \underline{A})$). Thus, type $\underline{A}$ can be viewed as choosing α so as to solve:

$$\text{maximize}_\alpha \;\; s[\Pi^L(\alpha, \underline{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\alpha, \underline{A})]/[\Pi^L(\alpha, \bar{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\alpha, \underline{A})]. \tag{5}$$

As shown in the Appendix, $\underline{\alpha}^*$ is less than 1: the $\underline{A}$-type lawyer demands a contingent fee less than 1 and offers a payment of $\varphi(\underline{\alpha}^*, \underline{A}) = \Pi^L(1, \underline{A}) - \Pi^C(\underline{\alpha}^*, \underline{A}) - s < \Pi^L(1, \underline{A}) - s = \varphi(1, \underline{A})$. That is, the $\underline{A}$-type lawyer demands a compensation package (α_1, F_1) both of whose elements are less than what obtains under PFI.

To make more headway, reconsider the example $p(x) = \lambda x^\theta$, where $0 < \theta < 1$ and $\lambda > 0$. This function requires a further parametric restriction in order to ensure that $p^L(\alpha, A) \leq 1$ for all (α, A): $\bar{A} \leq (1/\theta)(\lambda^{-1/\theta})$. Then the lawyer's continuation payoff (assuming the subgame-perfect choice of effort) is $\Pi^L(\alpha, A) = ((1 - \theta)/\theta)(\alpha A\lambda\theta)^{1/(1 - \theta)}$ and the client's payoff is $\Pi^C(\alpha, A) = (1 - \alpha)A\lambda(\alpha A\lambda\theta)^{\theta/(1 - \theta)}$. It can be shown (see the Appendix) that $\underline{\alpha}^* = (1 - s/[(1 - \theta)z\underline{A}^{1/(1 - \theta)}])^{(1 - \theta)/\theta}$, where $z = \lambda^{1/(1 - \theta)}(\theta)^{\theta/(1 - \theta)}$, and that $\underline{\alpha}^*$ is increasing in $\underline{A}$. Thus, if the least valuable case increases in value, then the first lawyer visited will demand a larger share. As will be discussed in more detail below for the general two-type case, an increase in s reduces $\underline{\alpha}^*$.

Proposition 2 summarizes the perfect Bayesian equilibrium outcome for the case of unrestricted transfer payments; out-of-equilibrium beliefs that support this equilibrium, and the associated response of C to out-of-equilibrium demands by *L1*, can be found in the discussion above.[20]

> *Proposition 2*. Under Assumptions 1-5 (and $s < \hat{s}$), a separating equilibrium that employs the Pareto-optimal rejection function is as follows:
>
> (a) If $A = \bar{A}$, then the first lawyer visited demands $(\alpha_1, F_1) = (1, \Pi^L(1, \bar{A}) - s)$ and the client accepts with certainty. In equilibrium C's overall payoff is $\Pi^L(1, \bar{A}) - 2s$, *L1*'s payoff is s, and *L2*'s payoff is zero. *L1* buys the entire case from C, so *L1*'s effort is efficient.
>
> (b) If $A = \underline{A}$, then *L1* demands $(\alpha_1, F_1) = (\underline{\alpha}^*, \varphi(\underline{\alpha}^*, \underline{A}))$ with $\underline{\alpha}^* < 1$ and $\varphi(\underline{\alpha}^*, \underline{A})$ as specified earlier, and C rejects this demand with probability $r(\underline{\alpha}^*, \varphi(\underline{\alpha}^*, \underline{A}))$ as given in equation (4). If the demand is rejected, then *L2* is visited (at an additional search cost s), resulting in the equilibrium demand $(1, \Pi^L(1, \underline{A}))$, which C accepts. In equilibrium, C's overall payoff is $\Pi^L(1, \underline{A}) - 2s$, *L1*'s payoff is $(1 - r(\underline{\alpha}^*, \varphi(\underline{\alpha}^*, \underline{A})))(\Pi^L(\underline{\alpha}^*, \underline{A}) + \Pi^C(\underline{\alpha}^*, \underline{A}) - \Pi^L(1, \underline{A}) + s)$, and *L2*'s payoff is again zero. *L1* does not buy the entire case, so he exerts too little effort.

The following comparative statics result holds if $\underline{\alpha}^*$ is to the right of the kink shown in Figure 1; that is, if $r(\underline{\alpha}^*, \varphi(\underline{\alpha}^*, \underline{A})) < 1$ on the boundary of the set. It is straightforward to show that $d\underline{\alpha}^*/ds < 0$: an increase in the search cost implies a <u>decrease</u> in the equilibrium contingent fee for an $\underline{A}$-type lawyer. This reflects both a direct and an indirect effect; the direct effect is that an increase in s makes a second search less attractive to C; but a lower likelihood of search increases the incentive for an $\bar{A}$-type to mimic the $\underline{A}$-type. The indirect effect is that the $\underline{A}$-type lawyer lowers his contingent fee to reduce the incentive for mimicry, thus allowing the client to reduce her rejection rate for the $\underline{A}$-type demand; that is, $dr(\underline{\alpha}^*, \varphi(\underline{\alpha}^*, \underline{A}))/ds < 0$.

5. Equilibrium analysis when *F* = 0

We consider demands that specify a contingent fee, but restrict transfer payments to be zero. This represents the status quo in that lawyers are currently not allowed to make transfer payments to clients and, for the most part, clients suing for damages are wealth-constrained. We first consider the case wherein the client and any lawyer visited have common knowledge about the expected value of the case; then we modify the model to reflect private information on the part of the lawyers about the expected value of the case.

PFI Equilibrium when *F* = 0. When the client and lawyer have common knowledge about A, $L1$ will quote a contingent fee that may depend on the expected award, A, and which we denote by $\alpha^L(A)$. The client can either accept this offer or leave and visit $L2$, expending a one-time cost of s. As indicated in step (6) of the overall game, a client who has visited two lawyers can induce them to bid for the client's case. Thus, after visiting two lawyers, the winning bid (should the client initiate an auction) will be the contingent fee that maximizes the client's payoff; that is, $\alpha^C(A)$. Because $L2$ can anticipate the outcome of the auction (in which he will bid $\alpha^C(A)$ and win with probability 1/2), he will prefer to simply offer $\alpha_2 = \alpha^C(A)$ at step (5), which the client accepts.

Thus, the client's overall payoff is $\Pi^C(\alpha^C(A), A)$ - $2s$ if she rejects $L1$'s offer at step (4) and visits $L2$, and is $\Pi^C(\alpha^L(A), A)$ - s if she accepts $L1$'s offer at step (3). In order to ensure that all types will enter the market for legal services when only contingent fees can be used, we maintain the following assumption (a modification of Assumption 4), which is an implicit restriction on $\underline{A}$ in relation to the search cost s and the parameters of the problem. Note that, as $\Pi^C(\alpha^C(A), A)$ is increasing in A, we need only concern ourselves with the lowest-value case for both cases to be worth the client's choice to seek representation.

Assumption 4'. $\Pi^C(\alpha^C(\underline{A}), \underline{A}) - 2s \geq 0$.

Comparing the client's payoffs from visiting one versus two lawyers implies that, in order to maximize his payoff, $L1$ should charge the contingent fee $\alpha^L(A)$ such that:

$$\Pi^C(\alpha^L(A), A) = \Pi^C(\alpha^C(A), A) - s. \tag{6}$$

Any $\alpha^L(A)$ yielding a lower client surplus would be rejected (the client would visit a second lawyer and then, along the equilibrium path, she would accept $L2$'s demand of $\alpha^C(A)$), whereas any demand yielding a higher client surplus would be accepted by C but would result in lower profit for $L1$. In equilibrium the client, though indifferent, accepts the demand $\alpha^L(A)$ defined implicitly by equation (6).

Because $\Pi^C(\alpha, A)$ is increasing, and then decreasing, in α and reaches its maximum at $\alpha^C(A)$, equation (6) will have two solutions, one on either side of the function's peak. Because $\Pi^L(\alpha, A)$ is increasing in α, it follows that $\alpha^L(A)$ will be the larger solution; thus, if $s > 0$, then $\alpha^L(A) > \alpha^C(A)$ for $A \in \{\underline{A}, \bar{A}\}$. Moreover, as Assumption 4' implies that $\Pi^C(\alpha^C(A), A) - s > 0 = \Pi^C(1, A)$ for $A \in \{\underline{A}, \bar{A}\}$, it follows that $\alpha^L(A) < 1$ for $A \in \{\underline{A}, \bar{A}\}$. In the Appendix we show that $d\alpha^L(A)/dA < 0$; that is, the equilibrium contingent fee under PFI is a decreasing function of A. A lawyer who anticipates a higher award is willing (because of the client's credible threat to seek a second option) to represent the client for a lower contingent fee (recall that when F is unconstrained, the contingent fee is higher for higher A). These results are summarized below.

Proposition 3. When A is common knowledge and Assumptions 1 - 3 and 4' hold, $L1$ will demand the contingent fee rate $\alpha^L(A)$ to represent the client; moreover, $\alpha^L(A) \in (\alpha^C(A), 1)$, where $\alpha^L(A)$ satisfies equation (6). C will accept this demand: there is no second search in equilibrium. Furthermore, $\alpha^L(\underline{A}) > \alpha^L(\bar{A})$. For any given value of A, in equilibrium C's payoff is $\Pi^C(\alpha^L(A), A) - s = \Pi^C(\alpha^C(A), A) - 2s$, and $L1$'s payoff is $\Pi^L(\alpha^L(A), A)$. Finally, as $\alpha^L(A) < 1$, the lawyer exerts an inefficient level of effort.

As an example of the results of the PFI analysis, we reconsider the power-function example wherein $p(x) = \lambda x^\theta$, where $0 < \theta < 1$ and $\lambda > 0$. Recall that the lawyer's continuation payoff (that is, his payoff assuming the subgame-perfect choice of effort) is $\Pi^L(\alpha, A) = ((1 - \theta)/\theta)(\alpha A\lambda\theta)^{1/(1 - \theta)}$ and the client's payoff is $\Pi^C(\alpha, A) = (1- \alpha)A\lambda(\alpha A\lambda\theta)^{\theta/(1 - \theta)}$. The client's ideal value of α is $\alpha^C(A) = \theta$ for $A \in \{\underline{A}, \bar{A}\}$; that is, the client always wants the lawyer to have the contingent fee $\alpha = \theta$, independent of the value of A. If the client obtains two options, then the lawyers will compete for her case. In this event, the equilibrium bid is C's ideal contingent fee; that is, $\alpha^C(A) = \theta$ for $A \in \{\underline{A}, \bar{A}\}$. So C's continuation value after obtaining two options is given by $\Pi^C(\alpha^C(A), A) = \Pi^C(\theta, A)$, and *L1* is therefore able to charge $\alpha = \alpha^L(A)$ such that $\Pi^C(\alpha^L(A), A) = \Pi^C(\theta, A) - s$. Although this equation could be solved explicitly for $\alpha^L(A)$, this does not yield much insight. However, we do know that the example satisfies Assumptions 2 and 3, and therefore $\alpha^L(\underline{A}) > \alpha^L(\bar{A})$: in equilibrium, higher-value cases (that is, cases with higher values of A) involve lower contingent fees.

PAI equilibrium when F = 0. We now modify the model to reflect private information on the part of the lawyers about the expected case value, A, and we characterize a perfect Bayesian equilibrium. Consider the continuation game at step (6) if C were to conduct an auction. Let $B_2(\alpha_2 \mid B_1(\alpha_1))$ denote C's posterior belief, after having arrived at *L2* with beliefs $B_1(\alpha_1)$ and having received the demand α_2 from *L2*. We assume that, if at least one of the lawyers makes the demand $\alpha^C(B_2(\alpha_2 \mid B_1(\alpha_1)))$, then the client does not further revise her beliefs; this demand not only "confirms" her beliefs, it is her most-preferred contingent fee, given those beliefs. Under this assumption, it is a Nash equilibrium for both lawyers to bid $\alpha^C(B_2(\alpha_2 \mid B_1(\alpha_1)))$ in the auction, and for C to choose each of them with equal probability. To see why, notice that neither lawyer is tempted to deviate unilaterally from this demand, as this would not change C's beliefs and would only concede the case to the non-deviating lawyer. Because the lawyer can adjust his effort so as to obtain $\Pi^L(\alpha, A) > 0$ for any $\alpha > 0$ (see Assumption 1 and the discussion following), he always prefers a one-half chance of obtaining the case to foregoing the case altogether. Notice that, in the auction, the lawyers bid C's ideal contingent fee based on her beliefs coming into the auction, regardless of the true expected value of the case.[21]

Next, we specify the client's beliefs, $B_2(\alpha_2 \mid B_1(\alpha_1))$, after having visited two lawyers and received two demands. Suppose that *L1* has made a demand of α_1; then, should *C* visit *L2*, she will arrive with beliefs of $B_1(\alpha_1) \in \{\underline{A}, \bar{A}\}$. By definition, the demand $\alpha^C(B_1(\alpha_1))$ makes *C* indifferent between accepting *L2*'s demand and conducting the auction under the belief that $A = B_1(\alpha_1)$. We specify the beliefs $B_2(\alpha_2 \mid B_1(\alpha_1))$ as follows:

$$B_2(\alpha_2 \mid \underline{A}) = \underline{A} \text{ for } \alpha_2 = \alpha^C(\underline{A}); \text{ for all other } \alpha_2, B_2(\alpha_2 \mid \underline{A}) \in \{\underline{A}, \bar{A}\}.$$

$$B_2(\alpha_2 \mid \bar{A}) = \bar{A} \text{ for all } \alpha_2.$$

The implications of these beliefs are as follows. If *C* approaches *L2* with the belief that $B_1(\alpha_1) = \underline{A}$ and if *L2* makes the demand $\alpha^C(\underline{A})$, then *C* continues to believe that the expected case value is $\underline{A}$; *C*'s beliefs are "confirmed" by such a demand. For all other demands α_2, *C* may believe that the expected value of the case is either $\underline{A}$ or $\bar{A}$. On the other hand, if *C* approaches *L2* with the belief that $B_1(\alpha_1) = \bar{A}$, then she maintains this belief regardless of the demand made by *L2*. Because *C* knows that *L2* would like her to believe that her case has a low expected value (and because an *L2* of type $\bar{A}$ benefits more than does an *L2* of type $\underline{A}$ from a downward revision in *C*'s beliefs), *C* will rationally hold skeptical beliefs about demands that are meant to persuade *C* that the expected value of her case is actually low, contrary to her current beliefs.

We can now summarize equilibrium behavior by *C* and *L2* in the continuation game at step (5). When *C* approaches *L2* with the belief $B_1(\alpha_1)$, an optimal strategy for *L2* (regardless of whether *L2* observed $\underline{A}$ or $\bar{A}$) is to confirm *C*'s belief by demanding $\alpha_2 = \alpha^C(B_1(\alpha_1))$, and *C* accepts this demand. She obtains a payoff of $\Pi^C(\alpha^C(B_1(\alpha_1)), A)$ if the expected value of the case is A, for $A \in \{\underline{A}, \bar{A}\}$.

Next, consider the interaction between *C* and *L1*, anticipating the continuation equilibrium described above. Given the results from the PFI analysis, *L1* has an incentive to make a high contingent fee demand so as to suggest to the client that A is low (even if it is not); if the client were to blindly accept this, then *L1* would be able to inflate his payoff over what it would have been in the full-information setting. Thus, the model reflects the potential for the expert to mislead the lay person into accepting a worse deal than she would have obtained had she been fully informed. Of course, in the separating equilibrium the client does not accept the lawyer's demand blindly, and the true expected value A is revealed.

In this scenario, the client visits *L1* and discloses the details of her case. Having been offered the contingent fee α_1 by *L1* in step (2), the client believes that the expected value of her case is $B_1(\alpha_1)$. If she accepts *L1*'s demand, she expects to receive a payoff of $\Pi^C(\alpha_1, B_1(\alpha_1))$, whereas if she leaves to consult a second lawyer, she expects to pay the search cost s and to receive a payoff of $\Pi^C(\alpha^C(B_1(\alpha_1)), B_1(\alpha_1))$. The client will accept *L1*'s demand if $\Pi^C(\alpha_1, B_1(\alpha_1)) > \Pi^C(\alpha^C(B_1(\alpha_1)), B_1(\alpha_1)) - s$ and reject *L1*'s demand if $\Pi^C(\alpha_1, B_1(\alpha_1)) < \Pi^C(\alpha^C(B_1(\alpha_1)), B_1(\alpha_1)) - s$. She will be indifferent between accepting and rejecting *L1*'s demand if $\Pi^C(\alpha_1, B_1(\alpha_1)) = \Pi^C(\alpha^C(B_1(\alpha_1)), B_1(\alpha_1)) - s$. Randomizing is the means by which she can induce *L1* to reveal the true expected case value through the demand he chooses.

To preview the form of the equilibrium, *L1* will use the PFI demand relationship $\alpha^L(A)$ for $A \in \{\underline{A}, \bar{A}\}$;[22] C will accept the (relatively low) demand $\alpha^L(\bar{A})$ for sure, and she will reject the (relatively high) demand $\alpha^L(\underline{A})$ with a probability sufficient to deter mimicry by type $\bar{A}$. Thus, with only a contingent fee, both *L1* types choose their full-information strategies; all of the burden of deterring mimicry falls on the client. The beliefs that support this equilibrium are: $B_1(\alpha_1) = \underline{A}$ for all $\alpha_1 \geq \alpha^L(\underline{A})$; otherwise, $B_1(\alpha_1) = \bar{A}$. Note that C is skeptical about demands $\alpha_1 \in (\alpha^L(\bar{A}), \alpha^L(\underline{A}))$, assigning them to the weak type $\bar{A}$. Optimal behavior for C, given these beliefs, is to reject any demand $\alpha_1 > \alpha^L(\underline{A})$ (this is actually optimal regardless of beliefs) and any demand $\alpha_1 \in (\alpha^L(\bar{A}), \alpha^L(\underline{A}))$. Finally, there are demands strictly below $\alpha^C(\bar{A})$ that C would reject because even she believes that this share is too low to appropriately incentivize the lawyer to exert effort. However, C would accept with certainty any demand $\alpha_1 \in (\alpha^C(\bar{A}), \alpha^L(\bar{A}))$. Finally, C is indifferent between accepting and rejecting a demand of $\alpha^L(\bar{A})$ and a demand of $\alpha^L(\underline{A})$. However, as $\bar{A}$ is the weak type, he must receive his PFI payoff in a separating equilibrium. Thus, C must accept with certainty the demand $\alpha^L(\bar{A})$.[23]

Thus, there are only two candidate contingent fees, $\alpha^L(\bar{A})$ and $\alpha^L(\underline{A})$, with the former being employed in a separating equilibrium by type $\bar{A}$ and being accepted for sure. It remains to characterize circumstances under which a separating equilibrium exists, with type $\underline{A}$ demanding $\alpha^L(\underline{A})$; let r denote the probability with which C rejects the demand $\alpha^L(\underline{A})$. The incentive compatibility constraints are:

IC($\bar{A}$): $\Pi^L(\alpha^L(\bar{A}), \bar{A}) \geq (1 - r)(\Pi^L(\alpha^L(\underline{A}), \bar{A}))$;

IC($\underline{A}$): $(1 - r)(\Pi^L(\alpha^L(\underline{A}), \underline{A}) \geq \Pi^L(\alpha^L(\bar{A}), \underline{A}))$.

Taken together, these conditions imply that (in terms of the acceptance probability 1 - r):

$$1 - r \in [\Pi^L(\alpha^L(\bar{A}), \underline{A})/\Pi^L(\alpha^L(\underline{A}), \underline{A}), \Pi^L(\alpha^L(\bar{A}), \bar{A})/\Pi^L(\alpha^L(\underline{A}), \bar{A})]. \tag{7}$$

If this interval is non-empty, then the (refined) equilibrium value of r, denoted as r^*, is given by $r^* = 1 - \Pi^L(\alpha^L(\bar{A}), \bar{A})/\Pi^L(\alpha^L(\underline{A}), \bar{A})$.[24] Assumption 6 provides a sufficient condition for this interval to be non-empty.

Assumption 6. $\Pi^L(\alpha_1, A)/\Pi^L(\alpha_2, A)$ is (at least weakly) increasing in A for all $\alpha_1 < \alpha_2$.

Again, due to the complexity of the effort-choice continuation game, we cannot prove that Assumption 6 will hold for arbitrary $p(x)$ functions; however, it does hold for our three previously-mentioned examples. The ratio in Assumption 6 is strictly increasing in A for the examples $p(x) = x/(1 + x)$ and $p(x) = 1 - e^{-\lambda x}$, for $\lambda > 0$. This ratio is actually constant in A for the power-function example $p(x) = \lambda x^\theta$, where $0 < \theta < 1$ and $\lambda > 0$, and it is straightforward to show that for this particular example, $r^* = 1 - [\alpha^L(\bar{A})/\alpha^L(\underline{A})]^{1/(1 - \theta)}$.

To summarize, *L1*'s demand function in the PAI setting (with $F = 0$) is the same as in the corresponding PFI setting; the difference between the two analyses is that in the PAI setting the client employs a mixed strategy to provide incentives for types to separate. This means that, in equilibrium, a client seeks a second option a fraction of the time. Therefore, although the client's payoff is the same as under PFI, the lawyer's payoff is actually lower. All of this is more formally stated (for the general probability function satisfying Assumption 1) in the following proposition.

Proposition 4. When A is the lawyer's private information and Assumptions 1-3, 4' and 6 hold, then *L1* demands the contingent fee $\alpha^L(A) \in (\alpha^C(A), 1)$, where $\alpha^L(A)$ satisfies equation (6). In equilibrium, C accepts the demand of $\alpha^L(\bar{A})$ with probability one and rejects $\alpha^L(\underline{A})$ with probability r^*, leading to a second search. The client's overall payoff is the same as under PFI, $\Pi^C(\alpha^C(A), A) - 2s$, for $A \in \{\underline{A}, \bar{A}\}$. For $A = \bar{A}$, *L1*'s payoff is $\Pi^L(\alpha^L(\bar{A}), \bar{A})$ and *L2*'s payoff is zero, whereas for $A = \underline{A}$, *L1*'s payoff is $(1 - r^*)\Pi^L(\alpha^L(\underline{A}), \underline{A})$ and *L2*'s payoff is

$r^*\Pi^L(\alpha^C(\underline{A}), \underline{A})$. Thus, the expected payoff to the lawyers is less than was obtained under PFI. The lawyer exerts an inefficient level of effort in the continuation game; *L1* exerts $x^L(\alpha^L(A), A)$ in effort, and *L2* exerts $x^L(\alpha^C(A), A) < x^L(\alpha^L(A), A)$ in effort, for $A \in \{\underline{A}, \bar{A}\}$. Thus, the lawyer exerts (on average) yet less effort under PAI than under PFI.

Thus, we find that the client is no worse off than under PFI, but the lawyer is worse off due to the need to deal with the distortion introduced by revelation under PAI. In this case, the distortion shows up in the increased use by the client of search, not in the actual demand made. Of course, one important difference is that the distribution of contracts now involves two points for the same expected case value, $\underline{A}$: a fraction (1 - r^*) of the contracts will be at a contingent fee of $\alpha^L(\underline{A})$, and the rest will be at $\alpha^C(\underline{A})$.

6. Welfare implications

There are two aspects of the model that have important effects on welfare, where welfare is the sum of the payoffs for *C*, *L1*, and *L2*. These reflect the presence of (limited) market power on the part of lawyers (captured in the model via the search cost, *s*) and the presence of asymmetric information between the lawyers and the client. We consider these in turn, as both aspects produce unexpected results: (1) when $F = 0$ then increases in *s* may <u>improve</u> welfare; and (2) shifting from a no-transfer system to an unrestricted transfer system may <u>reduce</u> welfare. These results, although seemingly counterintuitive, will be seen to be reasonable.

The effect of changes in the search cost on welfare. In this section we hold the regime ($F = 0$ or F unrestricted) fixed and ask what happens when the search cost changes. To keep comparisons clear, we let W^i_j denote welfare under i = PFI or i = PAI and under $F = 0$ or F unrestricted ($j = 0$ or u, where u means "unrestricted"); thus, for example, social welfare in the F-unrestricted, PFI case would be denoted as W^{PFI}_u (the dependence of these measures on A is suppressed).

First, consider W^{PFI}_0. An increase in *s* reduces *C*'s payoff in equilibrium, because it is given by $\Pi^C(\alpha^C(A), A) - 2s$ for a given A. However, notice that increasing *s* increases $\alpha^L(A)$, resulting in greater effort in the trial subgame, reducing the moral hazard problem in the contingent-fee-only scheme. Because W^{PFI}_0 =

$\Pi^L(\alpha^L(A), A) + \Pi^C(\alpha^C(A), A) - 2s$, it is straightforward to show that $dW_0^{PFI}/ds \gtrless 0$ as $\Pi_1^L(\alpha^L(A), A)(\partial\alpha^L(A)/\partial s) \gtrless 2$. Both terms on the left are positive, for the reasons discussed earlier, so the issue is the magnitude of their product. In particular, $\partial\alpha^L(A)/\partial s = -1/\Pi_1^C(\alpha^L(A), A)$. As s becomes small, $\Pi_1^C(\alpha^L(A), A)$ becomes arbitrarily close to $\Pi_1^C(\alpha^C(A), A)$, which is zero by the definition of $\alpha^C(A)$, so that $\partial\alpha^L(A)/\partial s$ becomes arbitrarily large. Thus, when s is "small," then $\Pi_1^L(\alpha^L(A), A)(\partial\alpha^L(A)/\partial s) > 2$, whereas if s is sufficiently large then it can be shown that $\Pi_1^L(\alpha^L(A), A)(\partial\alpha^L(A)/\partial s) < 2$.[25] This means that when s is small, an increase in s <u>improves</u> welfare. This occurs because although C is hurt directly via an increase in s, the increased subgame efficiency from increasing $\alpha^L(A)$ overcomes this social loss and raises the payoffs from the subgame to both C and $L1$. However, as $\alpha^L(A) < 1$, the benefit via the subgame is diminishing, whereas the harm to C is linear in s.

Social welfare in the $F = 0$ case under PAI is the same as under PFI for $A = \bar{A}$; when $A = \underline{A}$ it is:

$$W_0^{PAI} = W_0^{PFI} - r^*[\Pi^L(\alpha^L(\underline{A}), \underline{A}) - \Pi^L(\alpha^C(\underline{A}), \underline{A})].$$

The added complication is that one needs to find the effect of s on the second term, which includes both the direct effect on the coefficient of r^*, as well as the effect on r^* itself, through the effect of s on $\alpha^L(\underline{A})$. Because the coefficient of r^* goes to zero as s does, if r^* does not increase too fast as s becomes very small, then a qualitative result similar to the full-information result emerges: when s is small enough, an increase in s improves welfare W_0^{PAI}. We have been unable to verify this property in general due to the complex dependence of W_0^{PAI} on s when $A = \underline{A}$, but this result does hold for the power function version of $p(x)$.

The PFI, F-unrestricted case is very easy. From Proposition 1, $W_u^{PFI} = s + \Pi^L(1, A) - 2s$, so it is immediate that $dW_u^{PFI}/ds < 0$ for all s. This is because, under PFI, the subgame always involves the efficient level of effort, so although lawyer $L1$ obtains s ($L2$ is never visited by this C), C's payoff declines at twice the rate that $L1$'s increases. Finally, in the computation of dW_u^{PAI}/ds, the calculations are more tedious than in the PFI case, but the result is the same: $dW_u^{PAI}/ds < 0$. To see this, first observe that when $A = \bar{A}$, as discussed in Proposition 2, welfare is the same as the full-information case. The complication arises in the $\underline{A}$-case, as now search occurs in equilibrium. Because $L2$'s payoff is zero, the expected social welfare value,

W_u^{PAI} is:

$$W_u^{PAI} = (\Pi^L(1, \underline{A}) - 2s) + \{(1 - r(\underline{\alpha}^*, \varphi(\underline{\alpha}^*, \underline{A})))(\Pi^L(\underline{\alpha}^*, \underline{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\underline{\alpha}^*, \underline{A}))\}.$$

Recall that $\underline{\alpha}^*$ was found by maximizing the term in braces with respect to α (see equations (4)-(5)), where $1 - r(\underline{\alpha}^*, \varphi(\underline{\alpha}^*, \underline{A}) = s/[\Pi^L(\underline{\alpha}^*, \bar{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\underline{\alpha}^*, \underline{A})]$ also depends directly on s. Although the term in braces is increasing in s, that rate of increase is less than 2, which is the rate at which the first term above decreases: the effect on W_u^{PAI} is mostly via the direct loss to C's payoff, so once again $dW_u^{PAI}/ds < 0$ for all s.

The effect of changes in the compensation scheme on welfare. The effect of changing from the no-transfer to the unrestricted-transfer regime, although straightforward for the PFI case, is more complex for the PAI case. Under PFI it is straightforward to show that C prefers the regime with transfers whereas $L1$ prefers the regime with contingent fees only. Moreover, overall welfare is higher in the regime with transfers (see the Appendix for the proof of these statements). When we turn to the PAI case, this comparison is unchanged for the case of $A = \bar{A}$: $W_0^{PAI} < W_u^{PAI}$. However, the comparison when $A = \underline{A}$ is much more complicated, so for this discussion we have numerically analyzed the power-function model from earlier ($p(x) = \lambda x^{\theta}$), with the following parameter assumptions: (1) $\lambda = 1$; (2) $\theta = 0.5$; (3) $\bar{A} = 1.5$; and (4) $\underline{A} = 1$; this implies an upper bound for s of 0.0625 (due to Assumption 4', which is the tightest constraint on s). The numerical results for this example, which are illustrated in Figure 2, show that when s is sufficiently small then the difference in welfare measures, $\Delta^{PAI}(\underline{A}) \equiv W_u^{PAI} - W_0^{PAI}$, is strictly positive, but when s is sufficiently large (but still satisfies the credibility requirement of Assumption 4') then $\Delta^{PAI}(\underline{A}) < 0$. This occurs because as s grows, it

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Please place Figure 2 about here

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becomes more costly for C to search, and C optimally adjusts the rejection probability in both compensation schemes, though in different directions. In the F-unrestricted scheme, the rejection probability falls. To maintain separation, the low-type of *L1* must <u>reduce</u> $\underline{\alpha}$*, leading to reduced subgame efficiency when *C* does not reject the demand. Both effects work to reduce welfare. On the other hand, in the no-transfer scheme, an increase in *s* allows *L1* to demand a higher contingent fee, leading to greater subgame efficiency when *C* does not reject the demand (however, to deter mimicry, rejection must occur with higher probability). In this case the two effects work in opposite directions on welfare. As a consequence, W_u^{PAI} falls faster than W_0^{PAI}, and for approximately half the allowed range of *s*, net welfare from a switch in policy ($\Delta^{PAI}(\underline{A})$) is negative. Thus, if the initial distribution of types puts enough weight on the low type, $\underline{A}$, and search costs are sufficiently high, then the expected welfare from the no-transfer policy will be greater than that from the unrestricted-transfer policy.

7. Conclusions and extensions

Three conclusions/implications can be drawn from the foregoing analysis. First, informational asymmetry appears to be less of a problem for clients than is lawyer market power. It is the cost of search, which reflects market power on the part of the lawyers, that reduces the payoff to the client, not asymmetry of information (as long as search costs are low enough for the client to credibly use the threat of search). In the case of the prevailing compensation scheme (no transfers), the lawyer's demands follow the same schedule under PAI and PFI; the inflation of the first lawyer's demand is fully attributable to the search cost. Furthermore, reducing search costs may actually reduce welfare, as it reduces the incentives for lawyer effort at trial. On the other hand, when transfers are allowed, then welfare is higher when search costs are reduced.

Second, allowing lawyers to make unrestricted-transfer demands with private information about the value of the case will not result in *L1* demanding to buy the entire case except at the highest possible award $\bar{A}$. This further implies that the claim (often made in the law and economics literature) that allowing lawyers to buy a client's case necessarily will lead to the elimination of moral hazard is incorrect. As shown, the presence of PAI leads to this being the outcome only for cases that have the highest expected value or cases wherein clients search a second time. More significantly, we found that the interplay of the lawyers' market power and PAI can result (for some levels of the search cost) in lower welfare in the unrestricted-transfer equilibrium than in the corresponding no-transfer equilibrium.

A third pair of implications concerns some issues we have not addressed, but which (at least qualitatively) seem to be reflected in our equilibrium. It is possible that the informational asymmetry is two-sided: perhaps clients know relevant information. In this case, we should expect that wary lawyers will have less reason to buy the case outright, leading to further downward-pressure on the contingent fee rates, which is qualitatively similar to our current result. It is also possible that lawyers might need the involvement of clients in the trial to come, but that comes automatically in our PAI analysis of the unrestricted-transfer case because, in contrast with the PFI version, α will generally be less than one in the equilibrium, meaning that clients continue to have a stake in the future of the case (unless they search for a second option, in which case they will be bought out). Furthermore, as Shukaitis (1987) has observed, buyout of a client that reduces her incentive to provide needed future cooperation with the lawyer is probably not as critical as one might initially believe, as this can be dealt with through an appropriate contract, so either way this particular concern seems to be second-order.

Finally, it would be valuable to relax our assumption that clients' expected payoffs are always high enough to induce them to enter the market for legal services and that search will always be a credible threat. High search costs and/or the use of contingent fees only could deter some clients from entering, whereas they would enter if they could capture more of the value of their case through transfer payments from lawyers. A full characterization of the results with arbitrary search costs (for which fully-separating equilibria may fail to exist) would be of value to understand the implication of allowing unrestricted sales of legal claims.

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Appendix

This Appendix contains material in support of arguments made in the text.

Proof that $\alpha = 1$ maximizes joint payoffs and that the derivative of joint profits is zero when $\alpha = 1$. By definition, $\Pi^L(\alpha, A) + \Pi^C(\alpha, A) = Ap(x^L(\alpha, A)) - x^L(\alpha, A)$, where $x^L(\alpha, A)$ maximizes $\alpha Ap(x) - x$. This latter problem is well-defined for all $\alpha \geq 0$, not only for $\alpha \leq 1$, and thus both $x^L(\alpha, A)$ and $\Pi^L(\alpha, A) + \Pi^C(\alpha, A)$ are also well-defined for all $\alpha \geq 0$. Differentiating yields:

$$\Pi^L_1(\alpha, A) + \Pi^C_1(\alpha, A) = [Ap'(x^L(\alpha, A)) - 1]x^L_1(\alpha, A).$$

Because $x^L_1(\alpha, A) > 0$, the sign of the left-hand-side is the same as the sign of $[Ap'(x^L(\alpha, A)) - 1]$. By definition, $\alpha Ap'(x^L(\alpha, A)) - 1 = 0$, so $[Ap'(x^L(\alpha, A)) - 1] > 0$ for $\alpha < 1$ and $[Ap'(x^L(\alpha, A)) - 1] = 0$ for $\alpha = 1$. Finally, $[Ap'(x^L(\alpha, A)) - 1] < 0$ for $\alpha > 1$. Thus, $\alpha = 1$ provides an unconstrained maximum of the combined payoffs, at which the first derivative of the combined payoffs is zero.

Proof that IC($\underline{A}$) is slack for sufficiently small search costs. In a separating equilibrium, IC($\underline{A}$) is slack as long as s is not too large. To see this, let $\hat{\alpha}$ maximize $\Pi^L(\alpha, \underline{A}) - \Pi^L(1, \bar{A}) + s + \Pi^C(\alpha, \bar{A})$ for fixed s; this expression is the right-hand-side of IC($\underline{A}$). Notice that $\hat{\alpha} < 1$ because if $\hat{\alpha}$ were equal to one we would need to have $\Pi^L_1(1, \underline{A}) + \Pi^C_1(1, \bar{A}) = 0$. However, as $\Pi^C_1(1, \bar{A}) = -\Pi^L_1(1, \bar{A})$ and $\Pi^L_1(1, \underline{A}) - \Pi^L_1(1, \bar{A}) < 0$, the equality cannot hold. Thus, $\hat{\alpha} < 1$; moreover, $\hat{\alpha}$ is independent of s, so let:

$$\hat{s} \equiv \Pi^L(1, \bar{A}) - (\Pi^L(\hat{\alpha}, \underline{A}) + \Pi^C(\hat{\alpha}, \bar{A})).$$

Then the right-hand-side of IC($\underline{A}$) is non-positive for all $s < \hat{s}$. As long as $r(\alpha, \varphi(\alpha, \underline{A}))$ is less than 1, the left-hand-side of IC($\underline{A}$) can always be made to be positive by an appropriate choice of α, so that the incentive constraint IC($\underline{A}$) is always slack. Moreover, from Assumption 5 it is straightforward to show that $d\hat{s}/d\bar{A} > 0$ and that $d\hat{s}/d\underline{A} < 0$, so that an increase in $\bar{A} - \underline{A}$ allows an increase in the upper bound on the allowable values of s such that we are guaranteed that IC($\underline{A}$) is always slack. The assumption that $s < \hat{s}$ is overly strong but expositionally convenient.

Proof that $\underline{\alpha}$ is less than 1 in the two-type case when F is unconstrained.* Let α^k solve the equation $s = \Pi^L(\alpha, \bar{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\alpha, \underline{A})$. This defines the value of α at which the "kink" occurs in Figure 1. Let $\underline{\alpha}^*$ denote the equilibrium contingent fee for $\underline{A}$. We have already noted in the text that $\underline{\alpha}^*$ cannot be less than α^k. Therefore, either $\underline{\alpha}^* = \alpha^k < 1$ or $\underline{\alpha}^*$ maximizes the expression:

$$s(\Pi^L(\alpha, \underline{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\alpha, \underline{A}))/(\Pi^L(\alpha, \bar{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\alpha, \underline{A})).$$

Let us consider the second possibility, as otherwise the result is immediate that $\underline{\alpha}^* < 1$. Let $n(\alpha) \equiv \Pi^L(\alpha, \underline{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\alpha, \underline{A})$ and let $\Delta(\alpha) \equiv \Pi^L(\alpha, \bar{A}) - \Pi^L(\alpha, \underline{A})$. Then, equivalently, $\underline{\alpha}^*$ maximizes $n(\alpha)/[\Delta(\alpha) + n(\alpha)]$. Both $n(\alpha)$ and $\Delta(\alpha)$ are increasing functions on [0, 1] with $n'(1) = 0$ and $n(1) = s$. Differentiating and collecting terms implies that the sign of the first derivative is the same as the sign of the expression $\Delta(\alpha)n'(\alpha) - n(\alpha)\Delta'(\alpha)$. Evaluating this expression at $\alpha = 1$ yields $-s\Delta'(1) < 0$. Thus, by moving α down below 1, the $\underline{A}$-type of lawyer improves his profit and thus $\underline{\alpha}^* < 1$. Hence, in both circumstances, $\underline{\alpha}^* < 1$.

Comparative statics of $\underline{\alpha}$.* At an interior solution (i.e., $\underline{\alpha}^* > \alpha^k$), $\underline{\alpha}^*$ will satisfy $\Delta(\underline{\alpha}^*)n'(\underline{\alpha}^*) - n(\underline{\alpha}^*)\Delta'(\underline{\alpha}^*) = 0$ and the associated second-order condition $\Delta(\underline{\alpha}^*)n''(\underline{\alpha}^*) - n(\underline{\alpha}^*)\Delta''(\underline{\alpha}^*) < 0$. The claim that $\underline{\alpha}^*$ falls as s

rises follows directly: $d\underline{\alpha}^*/ds = \Delta'(\underline{\alpha}^*)/[\Delta(\underline{\alpha}^*)n''(\underline{\alpha}^*) - n(\underline{\alpha}^*)\Delta''(\underline{\alpha}^*)] < 0$. Finally, the claims that $dr(\underline{\alpha}^*, \varphi(\underline{\alpha}^*, \underline{A}))/ds < 0$, as long as $r(\underline{\alpha}^*, \varphi(\underline{\alpha}^*, \underline{A})) < 1$, and that the $\underline{A}$-type's payoff rises as s increases, both follow from differentiation (recalling that s enters $n(\underline{\alpha}^*)$ directly).

Power-function example for the PAI, (α, F) case. Recall that $z \equiv \lambda^{1/(1-\theta)}(\theta)^{\theta/(1-\theta)}$. For the power-function example when there are two types, $\Delta'(\alpha) = \Delta(\alpha)/\alpha(1-\theta)$; thus, the function $\Delta(\alpha)n'(\alpha) - n(\alpha)\Delta'(\alpha)$ has the same sign as $\alpha(1-\theta)n'(\alpha) - n(\alpha) = (1-\theta)z\underline{A}^{1/(1-\theta)}(1 - \alpha^{(1-\theta)/\theta}) - s$. This expression is positive at $\alpha = 0$ (under Assumption 4), negative at $\alpha = 1$, and strictly decreasing. Thus there is a unique solution, $\underline{\alpha}^* = (1 - s/[(1-\theta)z\underline{A}^{1/(1-\theta)}])^{(1-\theta)/\theta}$, which maximizes the payoff of the $\underline{A}$-type lawyer.

Proof that $\alpha^L(A)$ is decreasing in A. To see how $\alpha^L(A)$ depends on A, use equation (5) to define $g(\alpha, A) \equiv \Pi^C(\alpha, A) - \Pi^C(\alpha^C(A), A) + s$. Then $g(\alpha^C(A), A) = s > 0$ and $g(\alpha^L(A), A) = 0$. Differentiating this latter expression and collecting terms implies that $d\alpha^L(A)/dA = -g_2/g_1$, where both expressions on the right-hand-side are evaluated at $(\alpha^L(A), A)$. Notice that $g_1(\alpha^L(A), A) = \Pi^C_1(\alpha^L(A), A) < 0$ as $\Pi^C(\alpha, A)$ is decreasing for $\alpha > \alpha^C(A)$. Moreover, $g_2(\alpha^L(A), A) = \Pi^C_2(\alpha^L(A), A) - \Pi^C_2(\alpha^C(A), A)$; this difference has the same sign as $\Pi^C_{12}(\alpha^L(A), A)$ because $\alpha^L(A) > \alpha^C(A)$. Recall from Assumption 3 that $\Pi^C_{12}(\alpha, A) < 0$ for all $\alpha > \alpha^C(A)$. Combining these sign results implies that $d\alpha^L(A)/dA < 0$.

Preferences over regimes under PFI. It is obvious that (using equation (6)), for $A \in \{\underline{A}, \bar{A}\}$:

$$W_0^{PFI} = \Pi^L(\alpha^L(A), A) + \Pi^C(\alpha^C(A), A) - 2s = \Pi^L(\alpha^L(A), A) + \Pi^C(\alpha^L(A), A) - s < W_u^{PFI} = \Pi^L(1, A) - s,$$

as $\alpha^L(A) < 1$, making $\Pi^L(\alpha^L(A), A) + \Pi^C(\alpha^L(A), A)$ always less than $\Pi^L(1, A)$. Thus, society prefers transfers.

C's payoff with transfers is $\Pi^L(1, A) - 2s$, whereas she receives $\Pi^C(\alpha^C(A), A) - 2s$ when transfers are restricted to be zero. Because $\Pi^L(1, A) > \Pi^C(\alpha^C(A), A)$, C prefers transfers. *L1*'s payoff under transfers is s, whereas *L1*'s payoff under contingent fees only is $\Pi^L(\alpha^L(A), A)$. Note that:

$$\Pi^L(\alpha^L(A), A) - s > 0 \text{ if and only if } \Pi^L(\alpha^L(A), A) + \Pi^C(\alpha^C(A), A) - s > \Pi^C(\alpha^C(A), A).$$

However, as $\Pi^C(\alpha^L(A), A) = \Pi^C(\alpha^C(A), A) - s$, then $\Pi^L(\alpha^L(A), A) - s > 0$ if and only if:

$$\Pi^L(\alpha^L(A), A) + \Pi^C(\alpha^L(A), A) > \Pi^C(\alpha^C(A), A).$$

The left-hand-side above is strictly greater that $\Pi^L(\alpha^C(A), A) + \Pi^C(\alpha^C(A), A)$ because combined profits are increasing in α and $\alpha^L(A) > \alpha^C(A)$. Thus, $\Pi^L(\alpha^L(A), A) - s > 0$.

Endnotes

1. In the model there is always unobservable lawyer effort, and the lawyer may possess private information about the expected value of the case. Private information before contracting is termed "pre-contracting asymmetric information," whereas "pre-contracting full information" means both parties know the expected case value before contracting.

2. http://www.vanderbilt.edu/econ/faculty/Daughety/DR-SearchBargainingandSignalingTechApp.pdf

3. The original application (Daughety, 1992) involves a consumer searching for the lowest price when multiple firms have private information about their common unit cost of production. This search model also appears in Daughety and Reinganum (1991, 1992), which endogenize retail policies such as stock-outs and durable price quotes, respectively.

4. Macey and Miller also discuss the merits of bidding in terms of contingent fees alone for the right to represent a client. In two recent cases (*In re Oracle Securities Litigation*, and *In re Auction Houses Antitrust Litigation*), the court used such auctions to allocate the role of lead counsel.

5. The court addressed this (*In re Oracle*, 136 F.R.D. 639, at 641) in awarding the role of lead counsel. McKee, Santore, and Shelton (2007) find, experimentally, that client-subjects reject contingent fee bids that are "too low,"and that higher contingent fees induce higher lawyer-subject effort (as predicted by the model).

6. Rubinfeld and Scotchmer (1993) also employ a screening model in which lawyers have private information about their abilities. With no search costs the client offers a single contract that is unacceptable to a low-quality lawyer, and searches until a (high-quality) lawyer accepts (Cotten and Santore, 2012, verify this experimentally).

7. Thus, the lawyer's opinion is a credence good; see Dulleck and Kerschbamer, 2006, for a survey, and Emons (2000); Wolinsky (1993, 1996); Pesendorfer and Wolinsky (2003); Fong (2005); and Fong and Zu (2011) for related papers. None of these models employ all of the features of our model.

8. Because lawyers in this model are homogeneous, we assume that the consultation fee is the same across all lawyers, reflecting competition among lawyers for clients; thus lawyers would use it to cover the cost of

their time spent in consultation, independent of whether they take the case or not.

9. A seeming solution to the hold-up problem is for lawyers to pay clients to come, but this presents an arbitrage opportunity for unharmed individuals (whose true search costs are negligible, as they have no disutility for documenting or discussing non-existent harm); this cannot be an equilibrium strategy for a lawyer.

10. Plaintiffs in the U.S. overwhelmingly employ contingent fees (Dana and Spier, 1993). An alternative scheme used in the U.K. involves a base fee, supplemented by a "success fee" (not a share of the award) if the case is won. See Table 2 in Hodges et. al. (2010), for more information.

11. In sequential-move games, where the early-chosen strategy affects payoffs both directly and indirectly through its effect on subsequently-chosen strategies of other players, it is often necessary to impose more regularity assumptions on payoff functions than would be required in simultaneous-move games.

12. In previous work (Martimort and Sand-Zantman, 2006; and Martimort, Poudou, and Sand-Zantman, 2010), an informed principal offers a contract to an uninformed agent, who then makes a nonverifiable effort choice. We combine moral hazard and private information, but the informed party offers the contract and makes the nonverifiable effort choice.

13. Standard refinements, such as the one we will use (D1), typically select the Pareto optimal separating equilibrium when there are multiple separating (and possibly pooling) equilibria; see Cho and Kreps (1987).

14. Other models in which one party uses two instruments to signal one aspect of private information include Milgrom and Roberts (1986), Lutz (1989), Linnemer (2002), and Inderst (2002). Bagwell and Ramey (1991) and Fluet and Emons (2009) model two parties with common private information, each wielding one signaling instrument.

15. Even if beliefs are non-degenerate, payoffs are linear in beliefs, because C knows that she will receive $\Pi^C(\alpha, \underline{A})$ if $A = \underline{A}$, and she will receive $\Pi^C(\alpha, \bar{A})$ if $A = \bar{A}$. Under the refinement D1, out-of-equilibrium beliefs will be either 1 or 0 (when they are relevant to C's decision).

16. This is rational because C knows that lawyers would like the client to believe that her case has a low expected value, and because an $L2$ of type $\bar{A}$ benefits more than does an $L2$ of type $\underline{A}$ from a downward revision in C's beliefs.

17. C can do no better than to accept such a demand (and if her beliefs were incorrect, then Assumption 5 implies that she would be strictly better off accepting it). Even if C were to reject it with positive probability, $L1$ could increase the transfer F_1 infinitesimally and guarantee acceptance.

18. Any (profitable) demand above $U(\bar{A})$ is dominated by one on $U(\bar{A})$ (with the same contingent fee but a lower transfer), and any demand between $U(\bar{A})$ and $U(\underline{A})$ or below $U(\underline{A})$ is rejected for sure, which $L1$ expects will result in his receiving 0.

19. It cannot be an equilibrium for $\underline{\alpha}^*$ to be in the interior of the horizontal segment ($\underline{\alpha}^*$ could be at the kink), because then it could be increased with no change in C's response (or the $\bar{A}$-type lawyer's demand). This would increase $\underline{A}$'s payoff, contradicting the hypothesized optimality of $\underline{\alpha}^*$.

20. The out-of-equilibrium beliefs that satisfy the D1 refinement are actually harsher; requiring that out-of-equilibrium demands on $U(\underline{A})$ be assigned to type $\bar{A}$. The weaker beliefs in the text are sufficient to support the D1 equilibrium outcome, and facilitate the exposition (even weaker probabilistic beliefs could also suffice).

21. This is a complicated continuation game, and we do not claim to characterize all possible equilibria; nevertheless, this seems to be a very plausible one (i.e., most analogous to the case with F unconstrained) in that it involves intense competition by the lawyers, should C conduct an auction.

22. Recall that equation (6) has two roots; the larger root is $\alpha^L(A)$, $L1$'s preferred solution under PFI. In the Technical Appendix we show that (under a strict version of Assumption 6 below) a separating equilibrium based on the smaller root does not survive refinement using D1.

23. Even if C rejected this demand with positive probability, type $\bar{A}$ could ensure certain acceptance by

cutting his demand by an arbitrarily small amount, given that demands in ($\alpha^C(\bar{A})$, $\alpha^L(\bar{A})$) are accepted with certainty.

24. Using the rejection probability that is just sufficient to deter mimicry reflects the use of D1to select the Pareto optimal separating equilibrium. It can be shown that the skeptical beliefs survive refinement using D1 (uniquely, if the ratio in Assumption 6 is strictly increasing; see the Technical Appendix).

25. The s-value at which the effect shifts from enhancing to diminishing welfare depends upon the details of the subgame. If such a value is ruled out by Assumption 4', then welfare always increases in s for the relevant range.

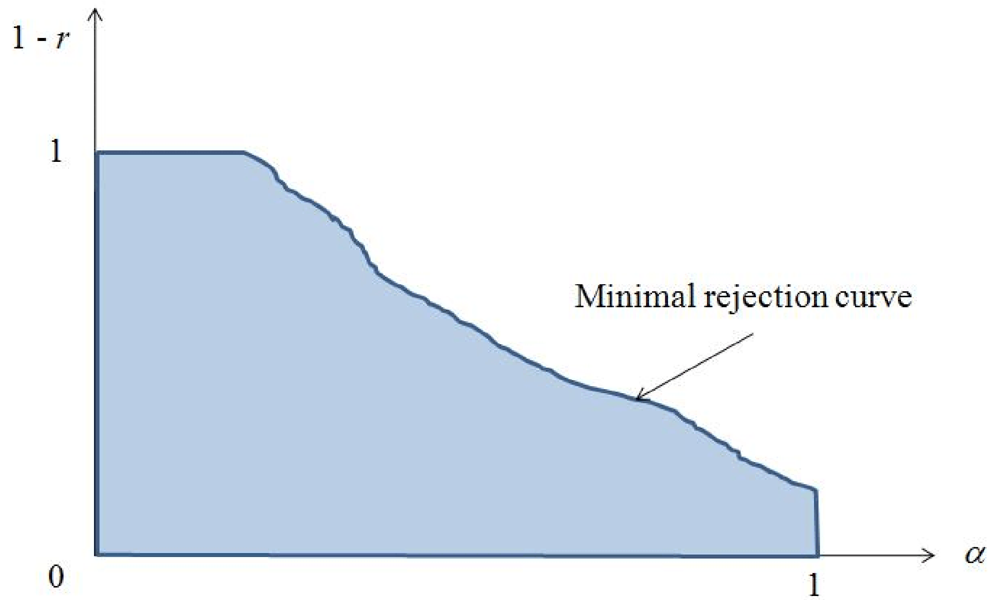

Figure 1: Alternative Equilibrium Rejection Probabilities

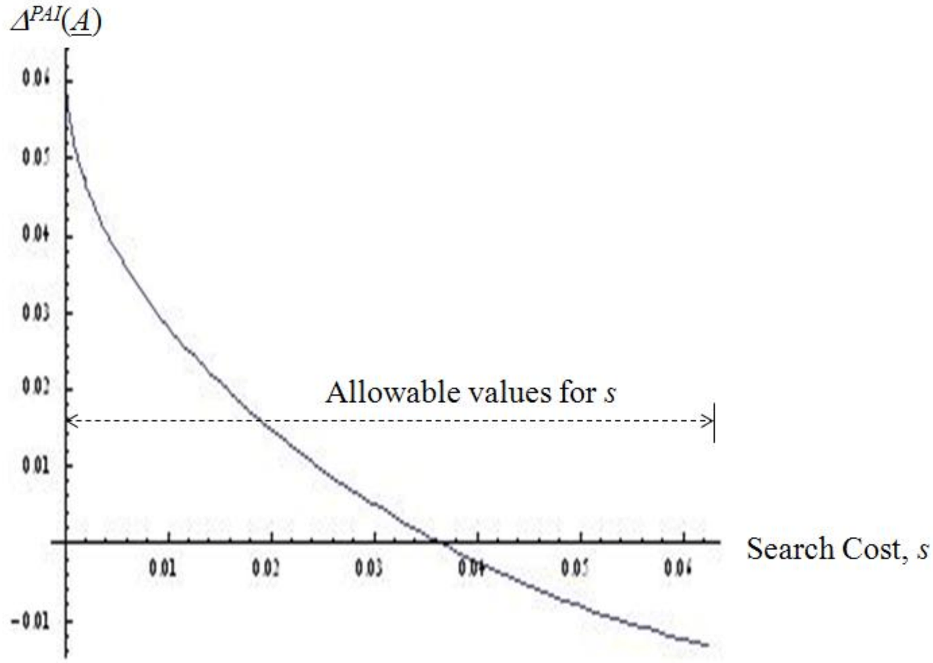

Figure 2: Net Welfare vs. Search Cost