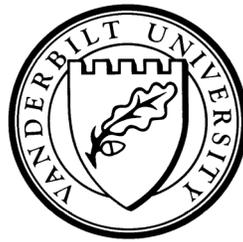


CLIENTS, LAWYERS, SECOND OPINIONS, AND AGENCY

by

Andrew F. Daughety and Jennifer F. Reinganum



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VANDERBILT UNIVERSITY
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www.vanderbilt.edu/econ

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Andrew F. Daughety
Jennifer F. Reinganum

Department of Economics and Law School
Vanderbilt University

andrew.f.daughety@vanderbilt.edu
jennifer.f.reinganum@vanderbilt.edu

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Andrew F. Daughety

Jennifer F. Reinganum

Department of Economics and Law School

Vanderbilt University

ABSTRACT

We model the game between an informed seller (a lawyer) and an uninformed buyer (a potential client) over the choice of compensation for the lawyer to take a case to trial, when there is post-contracting investment by the lawyer (effort at trial) that involves moral hazard. Clients incur a one-time search cost to contact a lawyer, which parametrically influences the monopoly power of the lawyer when he makes a demand of the client for compensation for his service. The client uses the demand to decide whether to contract with the lawyer or to visit a second lawyer so as to seek a second opinion, which incurs a second search cost. Seeking a second opinion shifts the bargaining power to the client by causing the lawyers to bid for the right to represent the client. We allow for endogenously-determined contingent fees alone (that is, the lawyer covers all costs and obtains a percentage of any amount won at trial) or endogenously-determined contingent fees and transfers; in this latter analysis, lawyers could buy the client's case. Under asymmetric information with only a contingent fee, in equilibrium the first lawyer visited demands a higher contingent fee for lower-valued cases, signaling the case's value to the client. If a transfer is also allowed, then in equilibrium the higher contingent fee (and transfer from the lawyer to the client) is obtained by the more valuable case, with only the highest-value case resulting in the lawyer buying the entire case (100% contingent fee with a transfer); again, in equilibrium, the value of the case is signaled. In both settings the client uses an equilibrium strategy that involves seeking a second opinion a fraction of the time, which induces separation. In equilibrium the presence of asymmetric information does not affect the client's expected payoff, but it does reduce the lawyer's expected payoff and it does increase moral-hazard-induced inefficiency on the part of the lawyer in the post-contracting investment.

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 in the exchange. We consider this problem in the context of a lawsuit: the hiring of a lawyer (the seller of a service) by a client who has been harmed, but who is comparatively ignorant about the value of a potential lawsuit. Complicating the adverse selection issue is that the lawyer will, after contracting based on his superior information about the value of the suit, decide the level of effort to take in pursuing the case at trial. Thus, the value to the buyer and the seller is contingent upon a post-contracting investment choice by the seller, leading to moral hazard.

This issue is of more than purely theoretical concern. Trade in tort claims is currently illegal in most jurisdictions, but this is changing. For some years most jurisdictions in the U.S. have allowed lawyers to take a fractional share of any winnings in a tort lawsuit (a “contingent fee” which in the U.S. tends to be one-third), based on the lawyer’s commitment to cover the costs; 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 in exchange for a claim on the eventual recovery (these are usually in the form of non-recourse loans, with no need for the recipient to repay should she lose her case). Theoretically, there would appear to be efficiency gains from transferring a claim to an informed expert (either a lawyer or a third party) because moral hazard problems associated with motivating appropriate effort by the lawyer could be resolved. However, 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 the relaxation of constraints on transferring the 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 in such a transaction.

Despite this often-voiced concern, previous analytical models that consider the determination of contingent fees (with or without transfers between the client and the lawyer or other third party) assume that the market for legal services is perfectly competitive (see the literature review for specific examples). As a consequence, lawyers try to attract clients by offering compensation structures that will appeal to the clients, rather than trying to fleece the clients. While we certainly believe that competition for clients plays an important role, we provide a model below 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 the extent of lawyers' market power and show that clients' equilibrium payoffs are higher when lawyers have less market power due to the client's outside alternative of seeking a second opinion. When the value of the client's award is common knowledge, the lawyer's equilibrium payoff is lower when search costs are lower.

We also consider the possibility that lawyers have private information about the value of the client's case. Upon conferring with the client, we assume that the lawyer learns the expected value of the case (the actual realized value will be determined at trial), but this information cannot be conveyed to the client in a credible manner. Rather, the lawyer quotes a compensation demand which consists of a contingent fee and - possibly - a transfer (we will consider both the prevailing situation in which the lawyer cannot make a transfer payment to the client and an unrestricted situation in which the lawyer can make a positive transfer payment to the client or demand a flat fee

from the client). The client observes this demand, draws any possible inferences from it regarding the value of her case, and decides whether to accept the lawyer's demand or to seek a second opinion by paying the search cost again. If the client seeks a second opinion, the second lawyer will also learn the expected value of her case (and it is assumed to be the same because it is an attribute of the case and both lawyers are experts in evaluating the case). However, having consulted two lawyers, we assume that the client can induce the lawyers to "bid" for her case. That is, having sought two opinions, 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. We find that the client's equilibrium payoff is quite simply-expressed and depends on the search cost in a very direct and intuitive way; indeed, the client makes the same payoff as she would make under full information. However, as is often the case in signaling models, the party with the private information – here, the lawyer – makes lower expected profits under private information than under full information.

When transfers are not possible (for example, because the client is financially-constrained and/or the lawyer is prohibited from paying the client), the equilibrium contingent fee is a decreasing function of the expected case value. Although the equilibrium contingent-fee demand is the same as under full information, it is now rejected with positive probability in favor of a second search

(which leads to competition). This leads to lower expected profits for lawyers.

On the other hand, when the lawyer can buy part or all of the case from the client, then the equilibrium contingent fee is an increasing function of the expected case value (as is the transfer paid to the client) because lawyers who know that the value of the case is lower choose to distort their compensation demands away from their full-information optima. This is because lawyers with higher-value cases have an incentive to masquerade as ones with lower-value cases, so demands suggesting that the case is low-valued are met with a higher probability of rejection by the client (so as to induce separation). Thus, in this case, both the client and the lawyer with a low-value case engage in behavior that discourages mimicry by the lawyer with the high-value case.

Since the contingent fee is also associated with the lawyer's subsequent effort in the case, this has implications for how efficiently the case is ultimately pursued (where the measure of efficiency here involves only the joint payoff of the client and her lawyer). When no transfers are allowed, a lawyer who knows the case is of lower value reveals this through choosing a higher contingent fee (it is higher than the client would ideally prefer, but the same as the lawyer would demand under full information). Due to the presence of asymmetric information, client search is increased, leading to lower contingent fees in a fraction of the cases. Thus, in this case private information results in lower lawyer effort (on average). Interestingly, when transfers (from lawyer to client) are also allowed, then a lawyer who knows the case is of lower value reveals this through choosing a lower (rather than higher) contingent fee; in this case, private information results in downward-distorted contingent fees which result in lower lawyer effort than would occur under full information. Search for a second opinion in this setting, however, results in an outcome wherein the case is sold outright and thus efficient effort is taken by the lawyer who represents the client in

equilibrium. Thus, the two alternative approaches generate substantially different pricing of legal services and potentially different results with respect to amelioration of moral hazard on the part of the lawyer.

Plan of the Paper

In Section 2 we describe some of the related literature, including the previous work on search which forms the basis of our model and the previous work on the determination of the equilibrium compensation structure for lawyers. In Section 3 we provide the primary notation and describe the continuation game in which a lawyer who has contracted for a case chooses his effort level at trial. Section 4 provides the full-information analysis for the cases wherein: 1) lawyers may only be compensated via a contingent fee; and 2) lawyers may demand a combination of a contingent fee and an endogenously-determined transfer. Section 5 revisits the two alternatives from Section 4, now allowing for asymmetric information as to the value of the case. Section 6 provides a discussion of the results and possible extensions. An Appendix provides details of some of the more technical aspects of the analysis.

2. Related Literature

Our model of the client-lawyer bargaining process involves history-dependent search, in which bargaining power switches endogenously as a consequence of the searching agent's behavior. This concept was pioneered by Daughety (1992) and was applied to the problem of a consumer searching for the lowest price at which to acquire an item. Multiple firms have a common (constant) marginal cost of production. The consumer can obtain a price quote from each firm by incurring a one-time search cost per firm; thereafter she can re-visit a firm costlessly. Thus, if she visits two

or more firms she can subsequently induce them to bid the price down (all the way to marginal cost) in an effort to capture her business. Under full information, the first firm visited therefore has an incentive to quote a price that will be as high as possible, subject to deterring further search. In equilibrium, the price is an increasing function of the search cost (up to the monopoly price).¹ When marginal cost is the private information of the firms, search cannot be completely deterred but the consumer's equilibrium probability of a second search (which initiates the bidding for her sale) is an increasing function of the price quoted by the first firm. In equilibrium, a two-price distribution obtains (one price at marginal cost, the other at a higher price which depends monotonically on the search cost) even though all agents are homogeneous. Thus, the potential for further search constrains the ability of the first firm to profit at the consumer's expense, even when the consumer does not search a second time.

Notice that the model involves a widespread inability to commit. The consumer cannot commit to search a specific number of times; she must decide on the spot whether or not to search again, after drawing any possible inferences from the first firm's price quote. Nor can the firm commit to a price; it is free to revise its price quote to undercut any rival bidder for the consumer's sale. We maintain this inability to commit in our model of lawyers being induced to bid for cases or for the more limited "right to represent" a client.

Macey and Miller (1991) argue that auctions should be used to determine 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 (which need not be a law firm); Shukaitis (1987) makes a similar argument for personal injury claims. Macey and Miller also discuss the merits of

¹ This search model also appears in Daughety and Reinganum (1991 and 1992), which endogenize the use of retail policies such as the probability of a stock-out and the notion of recall (i.e., durable price quotes), respectively.

lawyers bidding, in terms of contingent fees alone, to obtain the right to represent a client.²

Some of the previous related analytical literature has focused on the determination of the contingent fee, assuming no transfers between lawyer and client, under conditions of full information between the client and the lawyer.³ One standard result from such analyses is that competition by lawyers for clients will not lead to extremely low contingent fees since clients also recognize that the contingent fee incentivizes the lawyer's effort when effort is non-contractible⁴ (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). Using a specific functional form, Hay (1996) finds that the competitively-determined contingent fee is a decreasing function of the anticipated award. We consider the determination of the contingent fee, assuming no transfers between the client and the lawyer, when the lawyer has some market power and may also have private information about the value of the case. We allow bargaining power to shift endogenously between the lawyer and the client. We show how the contingent fee can be used to signal the case value when the client has a credible threat to search. Under full information, the equilibrium involves a lower contingent fee when the expected case value is high, so there is some reason to

² For example, in *In re Oracle Securities Litigation*, Judge Vaughn R. Walker allocated the role of lead counsel based on bids that specified qualifications and a contingent fee structure. In *In re Auction Houses Antitrust Litigation*, Judge Lewis A. Kaplan allocated the role of lead counsel based on bids that specified qualifications and an amount (contingent on recovery) that would go directly to the class members, with the excess recovery over and above that amount being split between the attorneys (25%) and the class (75%).

³ Polinsky and Rubinfeld (2003) propose a decentralized scheme with a zero-profit "administrator" acting to coordinate (under full information) the demand and supply of legal services in a manner which would achieve efficient effort choice by lawyers.

⁴ Judge Walker specifically addressed this concern (see *In re Oracle*, 136 F.R.D. 639, at 641) in awarding the role of lead counsel. McKee, Santore and Shelton (2007) examine an experimental market for lawyers' services and find that client-subjects do indeed reject contingent fee bids that are "too low" and that equilibrium bids are quite close to their predicted values. They also find that lawyer-subjects invest higher effort when the contingent fee is higher (as predicted by the model).

infer (under asymmetric information) a low case value from a high contingent fee demand. On the other hand, since both types of lawyer always prefer higher contingent fees, a client facing a high contingent fee demand has to respond with skepticism and (consequently) a higher probability of engaging in a second search, while a client can trust that a low contingent fee demand indicates that she has a high-value case.

When both a contingent fee and a transfer are allowed, if information is symmetric then it is clear that competition among lawyers will result in a contingent fee of 1 (leading the lawyer to exploit the case optimally); the client will receive a payment from the lawyer which is equal to the total surplus from the case. That is, the client simply sells the case to the lawyer as is standard in principal-agent models involving moral hazard alone. Our model with unconstrained transfers reflects these same forces in the event that the client searches twice, despite the fact that the lawyer has better information about the case than does the client. However, since the client also searches once in equilibrium with positive probability (that is, does not visit a second lawyer), lawyers will not always be engaged in competitive bidding. Nevertheless, the client's credible threat to search again limits the rents that lawyers can obtain.

There are two previous papers that consider both a contingent fee and a transfer between the client and her lawyer, under conditions of asymmetric information. Dana and Spier (1993) consider the case in which lawyers compete for clients by offering contracts. Although the contracts are offered prior to the receipt of any private information, it is common knowledge that the lawyer will subsequently receive private information about the likelihood that the plaintiff will win the case and the expected award contingent on winning. The contract is designed to motivate the plaintiff's lawyer to make an optimal decision about pursuing versus dropping the case upon receipt of his

private information. It is shown that a two-part contract consisting of a contingent fee and a transfer (which may be a payment from the lawyer to the client) can induce the lawyer to make the jointly-optimal decision about whether to drop or pursue the case. They also characterize the (second-best) optimal contingent fee when the transfer is constrained to be zero.

Our model is different in several ways. First, in our model the lawyer makes a take-it-or-leave-it offer if the client searches only once; on the other hand, if the client has approached two lawyers, then she can induce them to compete for her case. Thus, whether or not lawyers compete is determined in equilibrium as a consequence of client search. Second, in our model the contract is not determined *ex ante* of the receipt of private information; rather, the plaintiff's lawyer has private information about the value of the case when he makes a compensation demand, resulting in the potential for information transmission. Third, in our model it is not the pursue/drop decision that is of interest but rather the lawyer's subsequent choice of effort given the compensation structure. Thus, in addition to the usual dual functions of motivating the lawyer's choice of effort and dividing the value between the lawyer and the client, the compensation structure serves as an information-transmission mechanism that influences the client's search decision.

The paper that is arguably closest to ours is Rubinfeld and Scotchmer (1993); they consider a screening model in which a client is assumed to be better-informed than lawyers about the expected award in her case. Their model is a competitive screening one: uninformed lawyers offer a menu of contracts (which involve both a contingent fee and a transfer) to the informed client (whose likelihood of prevailing may be either High or Low). They find that the equilibrium contingent fee is 1 for low-value cases; that is, the lawyer purchases the entire case from the client when the case has the lower expected award. 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.

We find just the opposite result in our signaling model when both a contingent fee and a transfer are possible: the equilibrium contingent fee is 1 for the highest-value case, while lower-value cases are not purchased in full. In our model, the lawyer knows the true case value but he would like the client to believe that the case value is low (so he can get away with making a low transfer). Consequently, a client can trust the lawyer's suggestion that the case value is high (provided this is accompanied by a high transfer payment) but must react with skepticism when the lawyer suggests that the case value is low (skepticism results in a positive probability that the client will search again). This difference in results is not due to the screening versus signaling game form; rather, it follows from the fact that in our model it is the lawyer who has the private information about the case's value. In a screening model with the same information structure (wherein an uninformed client offers a menu of contracts to informed lawyers), we conjecture that the same pattern would arise; that is, the high-value case would be purchased in full while only a share of the low-value case would be purchased. However, the use of a transfer would be crucial here since all lawyer types prefer higher contingent fees so the contingent fee alone could not sort them.

In our model, the contingent fee alone can signal the expected value of the case, because of the client's endogenous search decision. This search decision can serve as the second "instrument" in the absence of a transfer payment, since a higher contingent-fee demand results in a higher probability of a second search. It is therefore interesting to observe that, when transfers are also permitted, both a contingent fee and a transfer (as well as the client's search decision) are used in equilibrium. That is, both the contingent fee component and the transfer component differ for the

high- and low-value cases. Moreover, the likelihood of a second search is also different, since the lawyer's demand associated with the high-value case is accepted for sure while the one associated with the low-value case is followed by a positive probability of a second search. Thus, both the client and the lawyer with a low-value case provide incentives to deter mimicry by the lawyer with a high-value case. The client provides incentives by searching with a positive probability following the demand associated with a low-value case, while the lawyer with a low-value case specifies a contingent fee less than 1 (which is the full-information optimal value). This is less attractive for a lawyer with a high-value case to mimic (as compared to a contingent fee of 1), and allows the client to engage in a second search with a lower probability than would otherwise be required.⁵

3. Model Setup

A client has been harmed and has decided to sue for damages. Let A be the expected award at trial for the case,⁶ where $A \in [\underline{A}, \bar{A}]$, with $0 < \underline{A} < \bar{A} < \infty$; we assume that A is distributed on $[\underline{A}, \bar{A}]$ following a cumulative distribution $H(A)$ with density $h(A)$ that has positive support everywhere on $[\underline{A}, \bar{A}]$. Initially we analyze the problem under full information, wherein we assume that A is common knowledge to both the client and all lawyers that the client visits. Later (under

⁵ Rubinfeld and Scotchmer (1993) also consider a screening model in which lawyers have private information about their abilities, while all other case attributes are common knowledge. A client visits an attorney and offers a menu of contracts; the attorney selects from the menu or rejects it entirely, in which case the client must search again. While client search is discussed, only extreme versions of it are considered. When search costs are zero, the client offers a single contract that is unacceptable to a low-quality lawyer, and she searches until a (high-quality) lawyer accepts the contract (Cotton and Santore, 2010, conduct an experimental test of this model and find that clients do sort lawyers as predicted). On the other hand, when search costs are prohibitive, the client offers a non-degenerate menu of contracts and lawyer types self-select; in this case, the optimal contingent fee is 1 on the contract targeted at the high-quality lawyer and (typically) less than one on the contract targeted at the low-quality lawyer.

⁶ We model a continuation game wherein the lawyer who contracts with the client chooses effort at trial. Since A is the expected award, then any realized award does not reveal the lawyer's effort, thereby allowing for moral hazard.

incomplete information) the value of A will be known by the lawyers but not by the client. All other attributes of the model will be common knowledge between the client and the lawyer(s), though the effort of any lawyer who ends up taking the case will not be verifiable. Formally, our analysis under incomplete information will be of an adverse selection problem with a moral hazard problem as 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, 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). This search cost is an important friction, providing the lawyer with some degree of monopoly power; the higher the search cost the less willing the client will be to seek a second opinion, and thus the greater the monopoly power of the first lawyer visited. The search cost (expended by the client for each new lawyer that the client visits) is only applicable to visiting a lawyer for the first time: returning to a previously-visited lawyer is costless while a visit to a yet another new lawyer will again cost s .⁷

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 $x \geq 0$; $p(0) = 0$, $\lim_{x \rightarrow \infty} p(x) = 1$.
Moreover, assume that $\lim_{x \rightarrow 0} p'(x) = \infty$ and $\lim_{x \rightarrow \infty} p'(x) = 0$.

The foregoing assumption means that the probability of winning at trial is increasing (but at a

⁷ One might think that the search cost at the second lawyer might be lower. It will become clear that s can be different for first and second searches without affecting the results; the necessary modifications should be obvious.

decreasing rate) in effort, and that at zero effort this probability is zero. The portions of the assumption that are addressing limits of the function or its derivative simply guarantee that the function acts like a probability ($p(x) < 1$ for all possible 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; let $w > 0$ be a lawyer's cost of a unit of effort expended, so that the lawyer's effort costs are wx . Finally, 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 award from trial obtained by the lawyer if the lawyer wins) and F is a transfer between the lawyer and the client. We assume that $0 \leq \alpha \leq 1$ and that F can be positive, zero, or negative. 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 ; a demand $(.5, F)$ with F negative would be a demand to represent the client wherein the client pays $|F|$ and the lawyer receives $|F|$ as a transfer payment as well as receiving half of any award that is won at trial; a demand of $(.333, 0)$ would be the traditional demand that the lawyer receives one-third of the award and no flat fee is paid or received by the lawyer.

The Effort-Level Continuation Game and the Overall Game

We first provide detail about the effort-level continuation game which is common to all the analyses to come. Assume that a lawyer and a client have agreed to a contract that specifies the lawyer's 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) , the lawyer's net payoff (that is, net of the transfer F) that both the client and the lawyer anticipate from the lawyer's pursuit of the case is denoted $\Pi^L(\alpha, A)$. To find this, observe that, after agreeing to a contract, the plaintiff's

lawyer chooses x to maximize $\alpha Ap(x) - wx$; given the assumptions made on $p(x)$, this agency analysis is analogous to a standard problem in the classical theory of the firm. Under Assumption 1, there is a unique maximizer, denoted $x^L(\alpha, A)$, at which $\alpha Ap'(x) - w = 0$ and $\alpha Ap''(x) < 0$. As long as $\alpha > 0$, $x^L(\alpha, A) > 0$; 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, $\Pi^L(\alpha, A) \equiv \alpha Ap^L(\alpha, A) - wx^L(\alpha, A)$; under the maintained assumptions, $\Pi^L(\alpha, A)$, Π_1^L , Π_2^L , and Π_{12}^L are all strictly positive for all $\alpha > 0$. The lawyer's total profit, should he obtain the right to represent the client under a contract specifying (α^*, F^*) , is $\Pi^L(\alpha^*, A) - F^*$.

Sequence of Moves in the Overall Game

Given the understanding of the foregoing continuation 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 of C of (α_1, F_1) ;
- 3) If C accepts $L1$'s demand, then they contract at this demand and the game moves to the effort-level continuation phase discussed earlier.
- 4) If C rejects $L1$'s demand, then she expends a search cost s in visiting and discussing the case with lawyer 2 ($L2$); $L2$ learns A ;
- 5) Having visited two lawyers, C may now costlessly auction the right of representation to $L1$ and $L2$ via a first-price sealed-bid format, with the winner making the equilibrium demand (α^*, F^*) for this right. In equilibrium, the bidders will both offer the same compensation demand and each lawyer will be selected with probability $\frac{1}{2}$. The game then moves to the effort-level continuation phase discussed earlier.

In this game, the lawyers cannot pre-commit to their compensation demands and to avoid bidding for the right to represent the client, while 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 analysis. In the sections that follow we consider the preceding game when there is full information (A is known by clients and lawyers) and when there is incomplete information (A is private information known only by the lawyers).

4. Full-Information Analysis

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) and wants to contract with a lawyer so as to maximize her (the client's) expected return from the contract. Let $\Pi^C(\alpha, A) = (1 - \alpha)Ap^L(\alpha, A)$ be the client's payoff from trial when the lawyer chooses his effort in the previously-described continuation game based on his demand (α, F) with expected award value A; the client's payoff (ignoring search costs) is $\Pi^C(\alpha, A) + F$ and the lawyer's overall payoff is $\Pi^L(\alpha, A) - F$.

4.1 Full-Information Equilibrium when $F = 0$

We first consider the problem wherein F is restricted to be zero; only a contingent fee is allowed. Notice that $\Pi^C(0, A) = 0 = \Pi^C(1, A)$; the first equality follows from the fact that the lawyer puts in no effort if $\alpha = 0$ while the client gets no share of the award if $\alpha = 1$. This motivates the following assumption to assure a unique interior solution.⁸

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) $\Pi^C_{11} = -2Ap^L_1 + (1 - \alpha)Ap^L_{11} < 0$ at the peak.

⁸ 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.

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

$$\Pi_1^C(\alpha, A) = -Ap^L(\alpha, A) + (1 - \alpha)Ap_1^L(\alpha, A) = 0.$$

Clearly, the only source of conflict between the client and the lawyer concerning the setting of α would occur in the range of $\alpha \geq \alpha^C(A)$, since 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.⁹ Thus, in what follows, we will focus on properties of payoff functions and best response functions wherein $\alpha \geq \alpha^C(A)$.

Differentiating $\Pi_1^C(\alpha, A)$ and collecting terms provides the result that $d\alpha^C(A)/dA = -\Pi_{12}^C/\Pi_{11}^C$, where both expressions on the right-hand-side are evaluated at $(\alpha^C(A), A)$. We have assumed that $\Pi_{11}^C(\alpha^C(A), A) < 0$, so that $\text{sgn}\{d\alpha^C(A)/dA\} = \text{sgn}\{\Pi_{12}^C(\alpha^C(A), A)\}$. We make the following assumption.

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

We have made this assumption because we are unable to prove this property for $\Pi_{12}^C(\alpha, A)$ for general $p(\bullet)$ functions (see footnote 8). However, we have considered three fairly classic cases of $p(\bullet)$: 1) $p(x) = \lambda x^\theta$, where $0 < \theta < 1$ and $\lambda \leq 1$; 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. Thus, under Assumption 3, $d\alpha^C(A)/dA \leq 0$. Notice that the since the lawyer's incentives to work on the case are strengthened

⁹ A similar point is made by, for example, Hay (1996) and Santore and Viard (2001).

by an increase in either α or A , then Assumption 3 implies that as A increases, the client finds it optimal to reduce (or leave unchanged) the contingent fee α ; thus (at the client's optimum) the lawyer will get a lower share of the higher award A .

When a client visits a (first) lawyer, denoted as L1, and describes her case, this visit costs the client a one-time amount of s . Since $F = 0$, L1 offers to represent the client for a contingent fee alone, which may depend on the expected award, A , and which we denote by $\alpha^L(A)$ and derive below. The client can either accept this offer or leave and visit a second lawyer (L2, again at a one-time cost of s). As indicated in the fifth step 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 will be the contingent fee that maximizes the client's payoff; that is, $\alpha^C(A)$. This results in an overall payoff to the client of $\Pi^C(\alpha^C(A), A) - 2s$ if she visits two lawyers, and a payoff of $\Pi^C(\alpha^L(A), A) - s$ if she accepts the first lawyer's offer. In order to assure that all types will enter the market for legal services when only contingent fees can be used, we maintain the following assumption, which is an implicit restriction on \underline{A} in relation to the search cost s and the parameters of the problem.¹⁰ Note that, since $\Pi^C(\alpha^C(A), A)$ is increasing in A , we need only concern ourselves with the lowest-value case for all 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, the first lawyer should charge the contingent fee $\alpha^L(A)$ such that:

$$\Pi^C(\alpha^L(A), A) = \Pi^C(\alpha^C(A), A) - s. \quad (1)$$

¹⁰ In the next sub-section we modify this assumption to account for allowing transfers; we discuss the effect of relaxing these assumptions in Section 5.3.

Any $\alpha^L(A)$ yielding a lower client surplus would be rejected (the client would visit a second lawyer and then initiate the auction for the right of a lawyer to represent her), while any offer yielding a higher client surplus would be accepted by the client but would result in lower profit for the lawyer. In equilibrium the client, though indifferent, accepts the offer defined implicitly by equation (1).

Since $\Pi^C(\alpha, A)$ is first increasing, and then decreasing, in α and reaches its maximum at $\alpha^C(A)$, equation (1) will have two solutions, one on either side of the function's peak. As indicated earlier, since $\Pi^L(\alpha, A)$ is increasing in α , it follows that $\alpha^L(A)$ will be the larger solution to equation (1); thus, if $s > 0$, then $\alpha^L(A) > \alpha^C(A)$ for all $A \in [\underline{A}, \bar{A}]$. Moreover, since Assumption 4 implies that $\Pi^C(\alpha^C(A), A) - s > 0 = \Pi^C(1, A)$ for all $A \in [\underline{A}, \bar{A}]$, it follows that $\alpha^L(A) < 1$ for all $A \in [\underline{A}, \bar{A}]$.

In the Appendix we show that $d\alpha^L(A)/dA < 0$; that is, the equilibrium contingent fee under full information is a decreasing function of the award A . The functions $\alpha^C(A)$ and $\alpha^L(A)$ are illustrated in Figure 1. Here we have assumed that $\alpha^C(A)$ is everywhere declining (as will be seen in an example, below, it may be constant). A lawyer who anticipates a higher award is willing

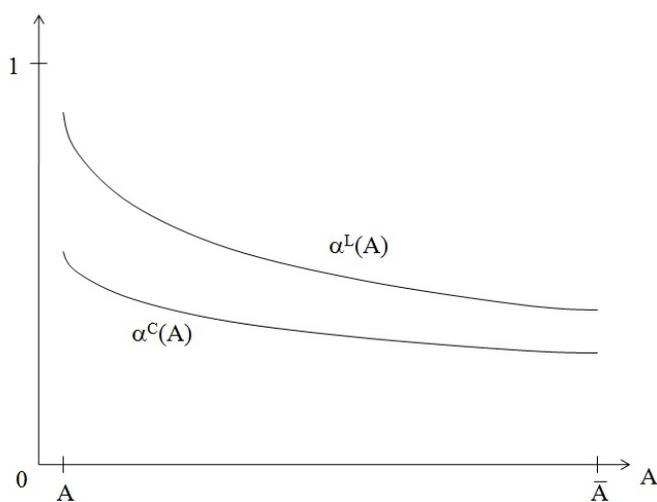


Figure 1: Equilibrium Contingent Fee Rates when $F = 0$

(because of the client's credible threat to seek a second opinion) to represent the client for a lower contingent fee. These results are summarized below.

Proposition 1. Under full information, Assumptions 1 - 4, and the restriction that F is zero, the first lawyer visited will demand the contingent fee rate $\alpha^L(A)$ to represent the client; $\alpha^L(A) \in (\alpha^C(A), 1)$, where $\alpha^L(A)$ satisfies equation (1). The client will accept this demand: there is no second search in equilibrium. Furthermore, $d\alpha^L(A)/dA < 0$ for all $A \in [\underline{A}, \bar{A}]$. In equilibrium the client's payoff is $\Pi^C(\alpha^L(A), A) - s = \Pi^C(\alpha^C(A), A) - 2s$, while the lawyer's payoff is $\Pi^L(\alpha^L(A), A)$. Since this latter payoff is increasing in s , increased search costs yields higher equilibrium lawyer profits. Finally, since $\alpha^L(A) < 1$, the lawyer exerts an inefficient level of effort in the continuation game.

An example

As an example of the results of the full-information analysis, assume that $p(x) = \lambda x^\theta$, where $0 < \theta < 1$ and $\lambda \leq 1$. This function satisfies Assumption 1, except that a further parameter restriction is needed to guarantee that $\lim_{x \rightarrow \infty} p(x) \leq 1$: $\bar{A} < (w/\theta)(\lambda^{-1/\theta})$. Then the lawyer's continuation payoff (that is, his payoff assuming the subgame-perfect choice of effort) is $\Pi^L(\alpha, A) = (w(1 - \theta)/\theta)(\alpha A \lambda \theta/w)^{1/(1-\theta)}$ while the client's payoff is $\Pi^C(\alpha, A) = (1-\alpha)A\lambda(\alpha A \lambda \theta/w)^{\theta/(1-\theta)}$. In the Appendix we verify that this example satisfies Assumptions 2 and 3 and show that the client's most-preferred value of α is $\alpha^C(A) = \theta$ for all $A \in [\underline{A}, \bar{A}]$. Thus, the client always wants the lawyer to have the contingent fee $\alpha = \theta$, independent of the value of A ; that is, $d\alpha^C(A)/dA = 0$.

Under full information, if the client obtains two opinions, then the lawyers will compete for her case. In this event, the equilibrium "bid" is the one the client most-prefers; that is, $\alpha^C(A) = \theta$ for all $A \in [\underline{A}, \bar{A}]$. So the client's continuation value after obtaining two opinions is given by $\Pi^C(\alpha^C(A), A) = \Pi^C(\theta, A)$. The first lawyer consulted 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 1 through 3,

and therefore $d\alpha^L(A)/dA < 0$: in equilibrium, higher-value cases (that is, cases with higher values of A) are contracted at lower contingent fees.

4.2 Full-Information Equilibrium when F is Unconstrained

Returning to the more general model originally posed, we now turn to the full information game wherein F is not constrained to be 0. Thus, demands by lawyers to represent a client are of the form (α, F) . In step 5 of the game, the client has expended a second search cost and obtained a second opinion. Then, after searching a second time and initiating the auction, she obtains (ignoring search costs) a payoff of $\Pi^C(\alpha^*, A) + F^*$, where $(\alpha^*, F^*) = (1, \Pi^L(1, A))$. This holds since both lawyers will 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 $\Pi^L(1, A) - F^* = 0$). Each lawyer bids the full profit from the case and obtains the right to the case with probability $1/2$; this is the familiar result from principal-agent theory (when both parties are risk neutral and there is moral hazard) that the principal should sell the firm to the agent, even though (as discussed earlier) the client in our analysis is not a principal: she cannot commit to a contract *ex ante* to the bargaining/search process.

Thus, if the client were to expend s and get a second opinion, she obtains (ignoring search costs) $F^* = \Pi^L(1, A)$. Therefore, upon visiting $L1$, this lawyer quotes an offer of (α_1, F_1) such that the client is just willing to accept it rather than visit $L2$ and initiate the auction. Such an offer must satisfy a version of equation (1) above, now modified to reflect the presence of transfers:

$$\Pi^C(\alpha_1, A) + F_1 = \Pi^C(1, A) + F^* - s. \quad (2)$$

$L1$ chooses (α_1, F_1) to maximize $\Pi^L(\alpha_1, A) - F_1$ subject to equation (2). Substituting from equation (2) yields that $L1$ chooses α_1 to maximize $\Pi^L(\alpha_1, A) + \Pi^C(\alpha_1, A) - \Pi^C(1, A) - F^* + s$. Since $F^* =$

$\Pi^L(1, A)$, only the first two terms are a function of α_1 , and the maximum is obtained at $\alpha_1 = 1$. Thus, the solution is that $(\alpha_1, F_1) = (1, \Pi^L(1, A) - s)$, so that $\Pi^C(\alpha_1, A) + F_1 = 0 + \Pi^L(1, A) - s$. 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 following proposition provides the details for this case and obtains under a weakening of Assumption 4:

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

This weakening of Assumption 4 reflects the fact that lawyers may now bid the contingent fee to 1 and redistribute all their profits to the client.

Proposition 2. Under full information, Assumptions 1 and 4', and allowing (α, F) to be chosen by the lawyer, the equilibrium demand made by the first lawyer visited satisfies equation (2) and 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 . That is, increased search costs yields higher equilibrium lawyer profits and a lower equilibrium client payoff. Finally, the lawyer who obtains the case exerts the efficient level of effort.

5. Asymmetric-Information Analysis

We now consider the problem when the lawyer is more informed about the value of the case (the expected award, A), than is the client. In particular, we assume that when the client visits a lawyer and describes her case, the lawyer learns (receives a private signal of) the case's true expected value A . The client knows only the prior distribution of A , denoted $H(A)$, with density $h(A) > 0$ on $[\underline{A}, \bar{A}]$. When the lawyer demands (α, F) to represent the client, the client infers that $A = B(\alpha, F)$; that is, the function $B(\bullet, \bullet)$ represents the client's beliefs about A .¹¹

¹¹ Because we are considering a separating equilibrium, we assume that the beliefs associate a single value of A with any given demand (α, F) .

As before, we consider the traditional contract, with demands of the form $(\alpha, 0)$, and then consider what would happen if lawyers could make demands for their services of the form (α, F) with F not restricted to be zero. As will be seen, the $(\alpha, 0)$ case under a continuum of types is quite complex, so in the text we extend the earlier example (wherein $p(x) = \lambda x^0$) so that the nature of the solution will be transparent; we have provided the more general signaling analysis in the Appendix. Also, in this case, we take beliefs to be $B(\alpha)$, suppressing the $F = 0$ term. The case wherein F is unrestricted is yet more complex, and we turn to that after the discussion of the $F = 0$ case.

5.1 Asymmetric-Information Equilibrium when $F = 0$

Here all the demand and bidding activity focuses on the contingent fee α . Given the results from the full-information analysis, there is an incentive for L1 to make a high 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 revenue over what it would have been in the full-information setting. Thus, the model reflects the policy concern that the expert might mislead the lay person into accepting a poorer deal than she would have been able to strike if she had been properly informed. Of course, in the separating equilibrium the client does not accept the lawyer's demand blindly, and in the separating equilibrium the true expected value A is revealed.

Having been offered the contingent fee α by the first lawyer visited, L1, the client expects that, if she searches again, she will obtain a payoff of $\Pi^C(\alpha^C(B(\alpha)), B(\alpha)) - s$. This is because she believes that the value of the case is $B(\alpha)$ and that the two lawyers will compete for her case by offering the contingent fee that (they think that she thinks) will maximize her payoff.¹² Therefore,

¹² Our game form (see steps 4 and 5 of the overall game in Section 3) does not involve a second possible signal from L2 about A , so C engages in no further updating. Alternatively: 1) L2 makes the same demand as L1, under the belief that he is the first lawyer visited; or 2) C ignores any demand made by L2 since she knows that she will initiate the auction for representing her case. Under either of these alternative interpretations, C engages in no further updating.

her expected payoff if she rejects the offer α with probability r (and searches again) is:

$$(1 - r)\Pi^C(\alpha, B(\alpha)) + r(\Pi^C(\alpha^C(B(\alpha)), B(\alpha)) - s).$$

Thus, she will accept the demand by L1 of α if $\Pi^C(\alpha, B(\alpha)) > \Pi^C(\alpha^C(B(\alpha)), B(\alpha)) - s$ and reject the demand α if $\Pi^C(\alpha, B(\alpha)) < \Pi^C(\alpha^C(B(\alpha)), B(\alpha)) - s$. She will be indifferent between accepting and rejecting the demand α if $\Pi^C(\alpha, B(\alpha)) = \Pi^C(\alpha^C(B(\alpha)), B(\alpha)) + s$; in this event she will be willing to randomize between the strategies of accepting the demand of α and rejecting it in favor of seeking a second opinion. Randomizing is the means by which she can induce the types of lawyers to reveal themselves (that is, for the first lawyer's demand to reveal the true value of the case).

From the first lawyer's point of view, the client will be using a rejection strategy that depends on the contingent fee he quotes: $r(\alpha)$. The first lawyer's payoff can be written as:

$$(1 - r(\alpha))\Pi^L(\alpha, A) + r(\alpha)\Pi^L(\alpha^C(B(\alpha)), A)/2.$$

That is, with probability $(1 - r(\alpha))$ the client accepts the contingent fee α , in which case the lawyer earns $\Pi^L(\alpha, A)$. But with probability $r(\alpha)$ the client rejects the offer α and seeks a second opinion, initiating an auction for the right to represent the client, so that the two lawyers then compete to represent the client. Since the client's belief upon observing the offer α is that A is equal to $B(\alpha)$, the contingent fee that the client will most prefer – and, therefore, the contingent fee that both lawyers will “bid” – is $\alpha^C(B(\alpha))$. Thus, each lawyer expects to obtain the case with probability $1/2$, and to make $\Pi^L(\alpha^C(B(\alpha)), A)$ from the case should he obtain it.

We are interested in a separating equilibrium, which consists of a rejection function $r(\alpha)$ that maximizes the client's expected payoff, given her beliefs $B(\alpha)$, and a demand function that maximizes the (first) lawyer's expected payoff, given the rejection function employed by the client. As will be shown below, the demand function will again be $\alpha^L(A)$. Finally, the client's beliefs must

be correct in equilibrium; that is, $B(\alpha^L(A)) = A$ for all $A \in [\underline{A}, \bar{A}]$. Note that the rejection function and beliefs must be defined for all $\alpha \in [0, 1]$, not just for equilibrium values of α .

In a separating equilibrium the following observations must hold. First, there will be a smallest and a largest contingent fee, denoted by $\underline{\alpha}$ and $\bar{\alpha}$, respectively. Second, the function $r(\alpha)$ must be increasing on $(\underline{\alpha}, \bar{\alpha})$; that is, the client must reject higher contingent fee offers with a higher probability since to do otherwise would invite mimicry and pooling. Third, since $r(\alpha)$ must be increasing on $(\underline{\alpha}, \bar{\alpha})$, it must be interior (i.e., $r(\alpha) \in (0, 1)$) on $(\underline{\alpha}, \bar{\alpha})$.

Fourth, this last point implies that the client must be made indifferent about searching again. Indifference implies that α must satisfy $\Pi^C(\alpha, B(\alpha)) = \Pi^C(\alpha^C(B(\alpha)), B(\alpha)) - s$. That is, there is a function $\alpha^0(A)$, such that $\Pi^C(\alpha^0(A), B(\alpha^0(A))) = \Pi^C(\alpha^C(B(\alpha^0(A))), B(\alpha^0(A))) - s$. Consistency of beliefs requires that $B(\alpha^0(A)) = A$, so that the indifference requirement is that:

$$\Pi^C(\alpha^0(A), A) = \Pi^C(\alpha^C(A), A) - s,$$

but this means that $\alpha^0(A)$ is identically equal to $\alpha^L(A)$. In other words, the full-information contingent-fee demand function, $\alpha^L(A)$, is also the separating equilibrium contingent-fee demand function. Since this function is downward-sloping, it provides the implied values of $\underline{\alpha}$ and $\bar{\alpha}$: $\underline{\alpha} = \alpha^L(\bar{A})$ and $\bar{\alpha} = \alpha^L(\underline{A})$. Fifth, the function $r(\alpha)$ must be continuous on $[\underline{\alpha}, \bar{\alpha})$, and continuous from the left at $\bar{\alpha}$. To see this, suppose to the contrary that there is a jump at some α in this interval; note that any jump must be upward since $r(\alpha)$ is increasing. But then type $A = (\alpha^L)^{-1}(\alpha)$ would prefer to cut his demand infinitesimally to gain a discrete reduction in the probability of rejection, which contradicts the fact that $\alpha^L(A)$ is the equilibrium contingent-fee offer function. Note that upward jumps to the right of $\bar{\alpha}$ are not ruled out and will, indeed, be part of the equilibrium. Finally,

regardless of out-of-equilibrium beliefs, $r(\alpha) = 0$ for $\alpha^C(\bar{A}) \leq \alpha < \underline{\alpha}$ and $r(\alpha) = 1$ for $\alpha > \bar{\alpha}$. Since $r(\alpha)$ is continuous at $\underline{\alpha}$, it follows that $r(\underline{\alpha}) = 0$; this provides a boundary condition for the equilibrium rejection function.

With this in mind, we proceed to re-analyze the example wherein $p(x) = \lambda x^\theta$, with $0 < \theta < 1$ and $\lambda \leq 1$, and again assuming that $\bar{A} < (w/\theta)(\lambda^{-1/\theta})$, so that $p^L(\alpha, A) \leq 1$ for all $A \in [\underline{A}, \bar{A}]$.¹³ If the lawyer offers the client the contingent fee α , the client believes that $A = B(\alpha)$. But since she prefers the contingent fee $\alpha^C(A) = \theta$ for all $A \in [\underline{A}, \bar{A}]$ (and the lawyers also know this), she believes that if she searches again and obtains a second opinion, the lawyers will bid her preferred fee and she will obtain a payoff of $\Pi^C(\theta, B(\alpha)) - s$. Similarly, the first lawyer's payoff can be written as:

$$(1 - r(\alpha))\Pi^L(\alpha, A) + r(\alpha)\Pi^L(\theta, A)/2.$$

In the Appendix we show that, using the first-order condition for the first lawyer's problem (along with consistency of beliefs, so as to obtain a separating equilibrium), one can derive the client's equilibrium rejection function to be:

$$r(\alpha) = 1 - [\underline{\alpha}^{1/(1-\theta)} - (1/2)\theta^{1/(1-\theta)}]/[\alpha^{1/(1-\theta)} - (1/2)\theta^{1/(1-\theta)}].$$

Since $\underline{\alpha} > \theta$, then as α increases, $r(\alpha)$ increases on $[\underline{\alpha}, \bar{\alpha}]$ at a decreasing rate, with $r(\bar{\alpha}) < 1$.

To summarize, L1's demand function in the asymmetric-information setting (with $F = 0$) is the same as in the corresponding full-information setting; the difference between the two analyses is that in the asymmetric-information setting the client employs a mixed strategy to provide incentives for types to separate. This means that, in equilibrium, clients seek second opinions a fraction of the times that they obtain a first opinion. Therefore, while the client's payoff is the same

¹³ We focus on the example enhance intuition. The details of this specific analysis, and the analysis for a general $p(x)$ function, is in the Appendix.

as under full information, 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 3. Under incomplete information and the restriction that F is zero, the first lawyer visited will demand the contingent fee rate $\alpha^L(A)$ to represent the client; $\alpha^L(A) \in (\alpha^C(A), 1)$, where $\alpha^L(A)$ satisfies equation (1). In equilibrium, the client will accept this demand with probability $1 - r(\alpha^L(A))$; thus, there is a second search with probability $r(\alpha^L(A))$. Since r is increasing in α and α^L is decreasing in A , then the equilibrium likelihood of rejection is decreasing in A . In equilibrium the client's overall payoff is the same as under full information, $\Pi^C(\alpha^C(A), A) - 2s$, while the lawyer's payoff is $(1 - r(\alpha^L(A)))\Pi^L(\alpha^L(A), A) + r(\alpha^L(A))\Pi^L(\alpha^C(A), A)/2$, which is less than was obtained under full information. As was true in the full-information model, since $\alpha^L(A) < 1$, the lawyer exerts an inefficient level of effort in the continuation game; however, since $\alpha^C(A) < \alpha^L(A)$, the lawyer exerts (on average) yet less effort under asymmetric information than under full information.

As indicated in the Introduction, we find that the client is no worse off than under full information, while the lawyer is worse off due to the need to deal with the distortion introduced by revelation under incomplete information. In this case, the distortion shows up in the increased use by the client of search, not in the actual demands made. Of course, one important difference (as observed above) is that the distribution of contracts in the market for lawyers now involves two points for the same expected case-value A : a fraction $(1 - r(\alpha^L(A)))$ of the contracts will be at a contingent fee of $\alpha^L(A)$, while the rest will be at $\alpha^C(A)$.

5.2 Asymmetric-Information Equilibrium when F is Unconstrained

We now consider the more general problem when the lawyers can make demands of the client in terms of an (α, F) pair. Unfortunately, the solution to the general continuous-type problem generates a pair of equations defining the equilibrium rejection function that we have, thus far, been unable to fully solve. In order to get a basic intuition for the problem and its likely characteristics, we provide a two-type analysis; more precisely, we provide some of the basic intuition in the

continuum-type setting (when that provides a better perspective), but resort to the two-type model in order to demonstrate the effect of incomplete information on the equilibrium of the game.¹⁴ We will also briefly report results for a three-type analysis which relies upon the earlier power-function model of the probability of a win at trial; this should provide some further intuition.

Thus, formally, we assume that the client's case can take on two possible values, $\underline{A} > 0$ and $\bar{A} > \underline{A}$,¹⁵ we later describe the relationship between the two possible case types and the search cost, s . As before, after expending a second search cost s and visiting a second lawyer, the client can fully extract the profit from the case. This is because for any given A , the two lawyers will bid up the contingent fee to 100% in order to maximize the amount of available profit and then offer that entire profit as a transfer, $F^* = \Pi^L(1, A)$. Since the client anticipates this behavior in the bidding subgame, her decision rule is very simple: she accepts the lawyer who offers the highest transfer payment (and chooses each lawyer with equal likelihood if they make the same offer).

Let $B(\alpha_1, F_1)$ be the client's belief if the first lawyer visited demands (α_1, F_1) ; such a demand would yield a payoff to the client (ignoring her initial search cost) of $\Pi^C(\alpha_1, B(\alpha_1, F_1)) + F_1$. The client expects that visiting the second lawyer and initiating the auction to represent her will net $\Pi^L(1, B(\alpha_1, F_1)) - s$, so that the first lawyer's demand must just equate this payoff to what the client would get should she accept the first lawyer's demand. Thus, we first turn to characterizing beliefs.

As in the full-information F -unrestricted analysis, the first lawyer visited will seek to make a demand that makes the client indifferent between accepting the demand or seeking a second

¹⁴ For a previous analysis of one-dimensional private information being signaled with two instruments, see Milgrom and Roberts (1986), who consider a monopolist using price and advertising expenditure as signals of product quality (which can be either high or low).

¹⁵ At certain points in the analysis that follows we will express elements of the continuum-type model, as this allows us to employ derivatives.

opinion. For any value of the case, A , that indifference is captured by the equation:

$$\Pi^C(\alpha, A) + F = \Pi^L(1, A) - s.$$

Thus, the client's indifference curve for values of α and F and for any believed value of A (denoted as $U(A)$) is defined as:

$$U(A) = \{(\alpha, F) \mid F = \Pi^L(1, A) - s - \Pi^C(\alpha, A)\}.$$

Alternatively put, $U(A)$ provides the values of α and F that induce a belief that the case value is A .

Let $\varphi(\alpha, A) \equiv \Pi^L(1, A) - s - \Pi^C(\alpha, A)$, so that $(\alpha, \varphi(\alpha, A)) \in U(A)$. Two indifference curves for arbitrary levels of A (A' and A'' , with $\underline{A} \leq A' < A'' \leq \bar{A}$), are illustrated in Figure 2. While the indifference curves are illustrated as being convex, symmetric, and parallel shifts of one-another, this is not a necessary property. However, the same F -value occurs when $\alpha = 0$ or $\alpha = 1$, and the function first decreases, reaching a minimum at $\alpha^C(A)$, and then increases thereafter.

Returning to the incomplete-information analysis, in a separating equilibrium beliefs should be consistent; that is, if the true expected value of the case is A then the associated equilibrium

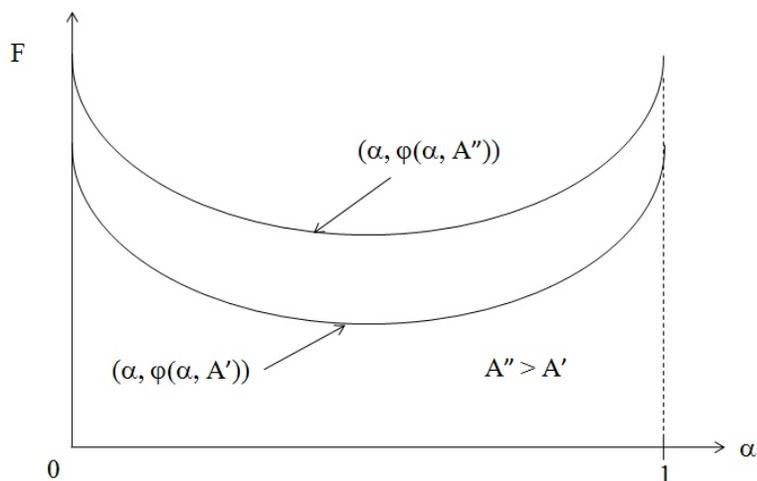


Figure 2: Examples of Client Indifference Curves

(α, F) -pairs should yield the belief $B(\alpha, F) = A$ when $F = \varphi(\alpha, A)$. More precisely, if $\alpha^*(A)$ is part of an equilibrium demand $(\alpha^*(A), \varphi(\alpha^*(A), A))$, then in equilibrium beliefs are consistent if:

$$B(\alpha^*(A), \varphi(\alpha^*(A), A)) = A \text{ for all } A.$$

We make the following general assumption, and then provide the two-type application of it.

Assumption 5: $\varphi(\alpha, A)$ is increasing in A for all $\alpha \in [0, 1]$. Equivalently, $\Pi^L(1, A) - \Pi^C(\alpha, A)$ is increasing in A for all $\alpha \in [0, 1]$.

The economic intuition behind this assumption is as follows. For any value of A , $\Pi^L(1, A)$ is the value of the maximum joint (full information) payoff to the lawyer and client, since the transfer F nets out and the resulting joint payoff, $\Pi^L(\alpha, A) + \Pi^C(\alpha, A)$, is maximized when $\alpha = 1$. In general, then: $\Pi^L(1, A) - \Pi^C(\alpha, A) > 0$ for all α . Assumption 5 asserts that this difference is increasing in A . Referring again to Figure 2, this implies that $U(A') \cap U(A'') = \emptyset$ if $A' \neq A''$; that is, the client's indifference curves never cross. This assumption is easily verified for the power-function example used earlier.

Figure 2 also illustrates the two indifference curves for the two-type model, by letting $A'' = \bar{A}$ and $A' = \underline{A}$, and can be used to understand the two-type separating equilibrium. Since \bar{A} would prefer to be taken to be \underline{A} , C should be skeptical about demands between the $U(\bar{A})$ and $U(\underline{A})$ loci. Specifically, C 's beliefs are that $B(\alpha, F) = \bar{A}$ for all (α, F) such that $F > \varphi(\alpha, \underline{A})$ and $B(\alpha, F) = \underline{A}$ otherwise. In other words, the client is not persuaded that $A = \underline{A}$ unless L 's demand is on or below $U(\underline{A})$. In a separating equilibrium, along the top curve (that for \bar{A}), the client's best response is to accept the demand (α_1, F_1) from the first lawyer with probability one. One of the points on this curve is the separating equilibrium first-visit demand made by the lawyer of type \bar{A} . Of course, any (α, F) above this curve would also be accepted with certainty by the client, as it would provide her with

a yet higher payoff, but any such point would reduce L1's profits. The lawyer with a case of type \underline{A} will choose a point from the lower curve but, as we will see, all points along that curve will be met with an appropriate (non-zero, non-unitary) probability of rejection by the client so as to just deter mimicry by the higher type. Demands in the region between the curves will be rejected with probability one (based on the belief that they are coming from the type \bar{A}) while points below the lowest curve will also be rejected with probability one (independent of the client's beliefs).

Formally, the incentive compatibility conditions for the two types, 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 that induces an alternative belief by the client, when the client rejects a demand of (α, F) with probability $r(\alpha, F)$:

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

and

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

In a separating equilibrium, when $A = \bar{A}$, then $r(\alpha, \varphi(\alpha, \bar{A})) = 0$; since \bar{A} is the “weakest” type which no other type wishes to mimic, a demand that is consistent with type \bar{A} can be accepted for sure. Thus, the left-hand-side of $IC(\bar{A})$ reduces to finding 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, $IC(\bar{A})$ simplifies to:

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

That is, the problem is to keep the weak type (\bar{A}) from mimicking the strong type (\underline{A}); this is accomplished by rejecting demands along $U(\underline{A})$ 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 $\alpha = 1$.

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

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

We next show that in a separating equilibrium, $IC(\underline{A})$ is always 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 . Notice that $\hat{\alpha} < 1$ since were $\hat{\alpha}$ equal to one we would need to have $\Pi_1^L(1, \underline{A}) + \Pi_1^C(1, \bar{A}) = 0$, but since $\Pi_1^C(1, \bar{A}) = -\Pi_1^L(1, \bar{A})$ and $\Pi_1^L(1, \bar{A}) > \Pi_1^L(1, \underline{A})$, it cannot be that $\hat{\alpha} = 1$. 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. 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. The assumption that $s < \hat{s}$ is overly strong but expositionally convenient.

Combining these two results provides a set of rejection functions for the client, each of which (with the beliefs as specified earlier) supports a separating equilibrium. Figure 3 illustrates this set of functions (expressed in terms of the probability of acceptance, $1 - r$). Note that any selection (that

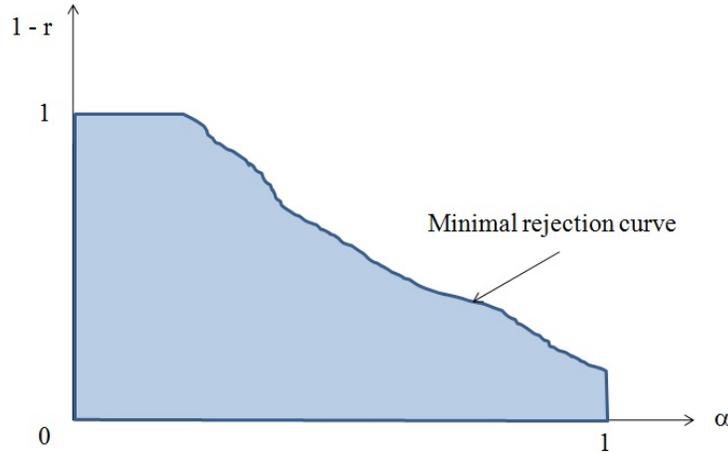


Figure 3: Alternative Equilibrium Rejection Probabilities

is, a function selected so that its graph is entirely in the region of interest) will satisfy the IC constraints, but the function represented by the upper boundary of the set will provide the one that yields separation with the least amount of rejection (search). 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.¹⁶ It is found by taking $IC(\bar{A})$ to be an equality which, upon solving, yields:

$$\begin{aligned} (1 - r(\alpha, \varphi(\alpha, \underline{A}))) &= s/(\Pi^L(\alpha, \bar{A}) - \varphi(\alpha, \underline{A})) \\ &= s/(\Pi^L(\alpha, \bar{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\alpha, \underline{A})). \end{aligned} \quad (3)$$

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:

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

As shown in the Appendix, this optimum (denoted as $\underline{\alpha}$) is less than 1, so that the type \underline{A} lawyer demands a contingent fee that is less than 100% and offers an up-front payment of $\varphi(\underline{\alpha}, \underline{A}) =$

¹⁶ The equilibrium strategies using this selected rejection function provides the unique separating equilibrium that satisfies D1.

$\Pi^L(1, \underline{A}) - \Pi^C(\underline{\alpha}, \underline{A}) - s < \Pi^L(1, \underline{A}) - s = \varphi(1, \underline{A})$. That is, the \underline{A} -type lawyer demands a compensation package (α_1, F_1) both of whose elements are less than what obtains in the full-information equilibrium. We note that (as can be seen in Figure 3) it is possible that $\underline{\alpha}$ is such that $1 - r = 1$ (though it cannot be to the left of this kink¹⁷); we have not been able to rule out this possibility and guarantee that the rejection rate for the \underline{A} -type is strictly positive, but we proceed to characterize an interior equilibrium.

To make more headway, let us again re-consider the power-function probability model¹⁸ discussed in the earlier $F = 0$ analysis. It can be shown that (see the Appendix):

$$\underline{\alpha} = (1 - s / [(1 - \theta)z\underline{A}^{1/(1-\theta)}])^{(1-\theta)/\theta}$$

where $z = \lambda^{1/(1-\theta)}(\theta/w)^{\theta/(1-\theta)}$. With some tedious algebra, it can be shown that $\underline{\alpha}$ is increasing in \underline{A} and decreasing in w . Thus, if the least valuable case increases in value, then the first lawyer visited will propose taking a larger share, while if (instead) the cost of a lawyer's time increases, he will propose a lower share. As will be discussed in more detail below for the general two-type case, an increase in s results in a reduction in $\underline{\alpha}$.

Proposition 4 summarizes the equilibrium for the full (α, F) , two-type case with a probability model which satisfies Assumptions 1 and 4'.

Proposition 4. In the two-type case, with $\bar{A} > \underline{A}$ and $s < \hat{s}$, a separating equilibrium which employs the most efficient rejection function is as follows:

¹⁷ It cannot be an equilibrium for $\underline{\alpha}$ to be in the interior of the horizontal segment in Figure 3, since then it could be increased with no change in the client's response (or the \bar{A} -type lawyer's demand). This would increase \underline{A} 's payoff, contradicting the hypothesized optimality of $\underline{\alpha}$.

¹⁸ This example can be extended to more (discrete) types following the same procedure (that is, assuming that higher types have an incentive to mimic lower types, but lower types do not have an incentive to mimic higher types). In the equilibrium, the contingent fee is monotonically increasing in A , reaching $\alpha = 1$ only for the highest type, \bar{A} .

- 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 such a demand with certainty.
- b) If $A = \underline{A}$, then the first lawyer visited demands $(\alpha, F_1) = (\alpha, \varphi(\alpha, \underline{A}))$ with $\alpha < 1$ and $\varphi(\alpha, \underline{A})$ as specified earlier, and the client rejects such a demand with probability $r(\alpha, \varphi(\alpha, \underline{A}))$. If the demand is rejected, the second lawyer is visited (at an additional search cost s), resulting in the two lawyers competing to buy the case. The equilibrium demand is $(1, \Pi^L(1, \underline{A}))$, and the client chooses a lawyer by randomly accepting one of the two demands.
- c) The beliefs that support this equilibrium are that $B(\alpha, F) = \bar{A}$ for all (α, F) such that $F > \varphi(\alpha, \underline{A})$ and $B(\alpha, F) = \underline{A}$ otherwise.
- d) The client's rejection function is $r(\alpha, F) = 0$ if $F \geq \varphi(\alpha, \bar{A})$; $r(\alpha, \varphi(\alpha, \underline{A}))$ as given in equation (3) for $F = \varphi(\alpha, \underline{A})$; and is otherwise equal to one.

The following discussion, and Proposition 5 below, presuppose an interior α ; that is, $r(\alpha, \varphi(\alpha, \underline{A})) < 1$ on the boundary of the set shown in Figure 3. It is straightforward to show that $d\alpha/ds < 0$: an increase in the client's search cost means that the equilibrium contingent fee for an \underline{A} -type lawyer falls. 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 lawyer to mimic the \underline{A} -type. The indirect effect is that the \underline{A} -type lawyer lowers his contingent fee, reducing the incentive for mimicry, thereby allowing the client to reduce her rejection rate for the resulting \underline{A} -type demand; that is, $dr(\alpha, \varphi(\alpha, \underline{A}))/ds < 0$.

Finally, the equilibrium payoffs are particularly interesting. When $A = \bar{A}$ the lawyer makes s in equilibrium profits while the client makes $\Pi^L(1, \bar{A}) - 2s$ (upon accounting for the fact that the client must pay s for the first visit and is made indifferent between accepting and searching a second time). This is the same as in the full-information version; see Proposition 2. When $A = \underline{A}$, the equilibrium involves a positive probability of search, $r(\alpha, \varphi(\alpha, \underline{A}))$. Then the first lawyer expects to make $(1 - r(\alpha, \varphi(\alpha, \underline{A}))) (\Pi^L(\alpha, \underline{A}) + \Pi^C(\alpha, \underline{A}) - \Pi^L(1, \underline{A}) + s)$. This holds since, with probability

$r(\underline{\alpha}, \varphi(\underline{\alpha}, \underline{A}))$) the client searches again and initiates the auction for the case, wherein the lawyers net zero profits. Notice that the term $(\Pi^L(\underline{\alpha}, \underline{A}) + \Pi^C(\underline{\alpha}, \underline{A}) - \Pi^L(1, \underline{A}) + s)$ is less than s , since for $\underline{\alpha} < 1$ we know that $\Pi^L(\underline{\alpha}, \underline{A}) + \Pi^C(\underline{\alpha}, \underline{A}) < \Pi^L(1, \underline{A})$. In other words, the \underline{A} -type lawyer makes less than s in profits. Thus, *ex ante*, the lawyer expects to make less than s in equilibrium profits. Not surprisingly (since the client is indifferent between searching the second time and accepting the first offer), if the client's case is worth \underline{A} , she makes an equilibrium payoff of $\Pi^L(1, \underline{A}) - 2s$, and an *ex ante* expected payoff of $(1 - H(\underline{A}))\Pi^L(1, \bar{A}) + H(\underline{A})\Pi^L(1, \underline{A}) - 2s$. This is formalized in the following proposition, which compares *ex ante* payoffs in the full- and incomplete-information settings.

Proposition 5. *C* gets the same *ex ante* expected payoffs in the full-information and the incomplete-information games. While a lawyer's *ex ante* expected payoff is s in the full-information game, it is less than s in the incomplete-information game.

Therefore, the lawyer, who is the informed agent, bears the cost of information being asymmetric, at least in an *ex ante* sense. Of course, if there is a marginal increase in the search cost this increases the initial bargaining power of the lawyers and results in an increase in their *ex ante* (and *interim*) expected payoff, and a reduction in that of the client.

5.3 On the Strengthening of Incentives for Clients to Seek Legal Representation when F is

Unconstrained

We now show that even though the equilibrium when F is unconstrained yields lower expected payoffs to lawyers than when F is restricted to be zero, lawyers may prefer the former regime to the latter. To see this, consider the context of contingent fees alone (that is, no transfer payment is permitted) and recall that we have assumed that $\Pi^C(\alpha^C(\underline{A}), \underline{A}) - 2s \geq 0$. Along with some other parametric assumptions we have maintained, this assumption ensures that a fully-separating

equilibrium exists. Since the client's *ex ante* expected payoff under a separating equilibrium is $E\{\Pi^C(\alpha^C(A), A)\} - 2s$, she will engage in the search process whenever this expected value is non-negative.

Now consider what would happen if $\Pi^C(\alpha^C(\underline{A}), \underline{A}) - s < 0$ but there is a value of $A \in (\underline{A}, \bar{A})$ such that $\Pi^C(\alpha^C(A), A) - s = 0$; for instance, this could occur if the search cost s were too high. Recall that in this context a lower case value is signaled by a higher contingent fee demand. If a second search is not credible following an inference of \underline{A} , then higher types would defect from their separating demands and pool with \underline{A} ; that is, there cannot be a fully-separating equilibrium. Instead, there would be a set of types $[\underline{A}, A^p]$, a pooled demand α^p that each of these types would make, and a probability of rejection $r(\alpha^p)$, such that: (1) $E\{\Pi^C(\alpha^p, A) | A \in [\underline{A}, A^p]\} = E\{\Pi^C(\alpha^C(A), A) | A \in [\underline{A}, A^p]\} - s$, so that the client would be willing to search a second time following a contingent fee demand of α^p ; and (2) the lawyer with the marginal case, A^p , is indifferent between demanding α^p and being rejected in favor of a second search with probability $r(\alpha^p)$, and demanding his separating contingent fee $\alpha^L(A^p)$, being properly-identified, and being rejected with probability $r(\alpha^L(A^p))$. The client's *ex ante* expected payoff is still $E\{\Pi^C(\alpha^C(A), A)\} - 2s$, so she will still engage in the first search as long as this expected value is non-negative. Of course, if the search cost s becomes so high that this expected value becomes negative, then the client will not enter the legal process (by searching for a lawyer to take her case). A similar partial-pooling issue would arise, in the context wherein both a contingent fee and a transfer are permitted, if search costs were sufficiently high that $\Pi^L(1, \underline{A}) - s < 0$, so as to render a second search not credible following a demand of $(\underline{\alpha}, \varphi(\underline{\alpha}; \underline{A}))$.

It appears that, in our model, lawyers would be better off if search costs were higher and if only contingent fees were allowed; indeed, Santore and Viard (2001) make this latter point, noting

that allowing transfers from lawyers to clients intensifies competition among lawyers and dissipates profits. However, this does not account for the possibility that higher search costs (they assume zero search costs), or the use of contingent fees only, also reduce the *ex ante* expected value of entering the legal process for clients, which is $E\{\Pi^C(\alpha^C(A), A)\} - 2s$ for the case of contingent fees only and $E\{\Pi^L(1, A)\} - 2s$ for the case of contingent fees and transfer payments. For a given value of search costs s , the former could be negative while the latter could be positive, indicating that the client would be deterred from seeking legal advice if only contingent fees were permitted, while she would seek legal advice if both contingent fees and transfers were feasible. Clearly, in this parameter configuration the lawyers would be better off if both contingent fees and transfers were permitted. A complete analysis of this issue is beyond the scope of this paper, but it seems clear that the client's decision to enter the market for legal advice is an important margin that needs to be incorporated in future research.

6. Conclusions and Extensions

Three conclusions/implications can be drawn from the foregoing analysis. First, in general, allowing lawyers to make (α, F) demands under incomplete information about the value of the case will not result in the first lawyer demanding to buy the case except at the highest possible award \bar{A} . We draw this conclusion by observing that initial demands will generally involve an equilibrium value of α which is less than one. This was shown in the two-type case for a general probability function, and this appears to extend to cases involving more (discrete) types; that is, $\alpha = 1$ only for the highest type. Since for all types except the highest type the client will search with positive probability, such search nets the client the best possible payoff (modulo having to search) of

$\Pi^L(1, A)$. Of course, when the first lawyer offers to buy the case, it only occurs for the highest type and involves the maximum transfer to the client of $F = \Pi^L(1, \bar{A}) - s$.

This raises the second conclusion: informational asymmetry appears to be less of a problem than 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. In the case of the traditional compensation scheme (no transfers), the lawyer's demands followed the same schedule under full as under asymmetric information; the inflation of the first lawyer's demand was fully attributable to the size of the search cost. Furthermore, one might conjecture that an increase in the number of qualified lawyers will (at least to some degree) reduce search costs, thereby reducing the premium that the first lawyer tries to charge a client.

A third pair of implications concern 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 asymmetric-information analysis of the (α, F) case since, in contrast with the full-information 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 opinion, in which case they will be bought-out). As Shukaitis (1987, page 340) has observed, buy-out of a client reducing 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 fade into the background.

Extensions

One important extension would be to allow for a third party, the “litigation-funder,” as briefly mentioned in the Introduction. Such third-party activity appears to be growing and the presence of litigation-funders has raised concerns with legislators and with practicing attorneys (see Beisner, et. al., 2009, a brief discussion written by three attorneys with a major law firm - Skadden - whose title suggests their perspective: “Selling Lawsuits, Buying Trouble”). There is no reason to expect that such third parties will have preferences that are consistent with those of either the client or the attorney, and the added conflict of incentives is likely to further influence the equilibrium pricing of legal services as well as the efficiency of the lawyer’s effort choice.

Alternatively, one could incorporate a model of the defense lawyer as a strategic agent who will also exert effort at trial, thereby complicating the model of the continuation game to allow for effort on the part of both competing lawyers. Defense lawyers are unlikely to be compensated via a contingent fee, but whatever is their compensation (e.g., per unit of effort), this will affect the incentives for the plaintiff’s lawyer to demand an (α, F) combination of the plaintiff.

A second extension is to allow for settlement bargaining activity as an alternative to trial as part of the continuation game after contracting. Hay (1997) has shown (for $F = 0$ and under full information) why contracting can lead to differential contingent fees for settlement versus trial activity by the lawyer. Adding a settlement phase to the continuation game can affect the information revelation process, possibly influencing the contracting problem as well as the incentives for the lawyer in his effort choice.

Finally, as discussed in Section 5.3, if search costs are high then a fully separating

equilibrium will fail to exist; some pooling will occur. A full characterization of this case would be of value to understand the implication of allowing unrestricted (α, F) -pricing of legal services. We have seen that the primary effect of (α, F) -pricing is on the lawyers, not the clients, when search costs are positive but not too great. This also presupposes that clients can fully utilize all the information at hand in order to know when to search. Breakdowns in either the search cost assumption, or more generally the full rationality assumption, may lead to quite different results than those predicted by the current model, and are of significant interest to investigate as well.

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Appendix

Proof that $\alpha = 1$ maximizes joint payoffs and that the derivative of joint profits is zero when $\alpha = 1$

By definition, $\Pi^L(\alpha, A) + \Pi^C(\alpha, A) = \text{Ap}(x^L(\alpha, A)) - wx^L(\alpha, A)$, where $x^L(\alpha, A)$ maximizes $\alpha \text{Ap}(x) - wx$. 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:

$$\Pi_1^L(\alpha, A) + \Pi_1^C(\alpha, A) = [\text{Ap}'(x^L(\alpha, A)) - w]x_1^L(\alpha, A).$$

Since $x_1^L(\alpha, A) > 0$, the sign of the left-hand-side is the same as the sign of $[\text{Ap}'(x^L(\alpha, A)) - w]$. By definition, $\alpha \text{Ap}'(x^L(\alpha, A)) - w = 0$, so $[\text{Ap}'(x^L(\alpha, A)) - w] > 0$ for $\alpha < 1$ and $[\text{Ap}'(x^L(\alpha, A)) - w] = 0$ for $\alpha = 1$. Finally, $[\text{Ap}'(x^L(\alpha, A)) - w] < 0$ 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 $\alpha^L(A)$ is decreasing in A

To see how $\alpha^L(A)$ depends on A , use equation (1) 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 $g_1(\alpha^L(A), A) = \Pi_1^C(\alpha^L(A), A) < 0$ since $\Pi^C(\alpha, A)$ is decreasing for $\alpha > \alpha^C(A)$. Moreover, $g_2(\alpha^L(A), A) = \Pi_2^C(\alpha^L(A), A) - \Pi_2^C(\alpha^C(A), A)$; this difference has the same sign as $\Pi_{12}^C(\alpha^L(A), A)$ because $\alpha^L(A) > \alpha^C(A)$. Recall from Assumption 3 that $\Pi_{12}^C(\alpha, A) < 0$ for all $\alpha > \alpha^C(A)$. Combining these sign results implies that $d\alpha^L(A)/dA < 0$.

Verification that the power-function example satisfies Assumptions 2 and 3

Let $f(\alpha) \equiv (1 - \alpha)(\alpha)^{\theta/(1-\theta)}$; since the client's payoff is proportional to $f(\alpha)$, the client's most-preferred contingent fee maximizes $f(\alpha)$. Notice that $f(0) = f(1) = 0$, and $f'(\alpha) (> <) as $\alpha (< >)$ θ . That is, $f(\alpha)$ first increases, reaches its peak at $\alpha^C = \theta$, and then decreases; moreover, $f''(\alpha) < 0$ for $\alpha \geq \alpha^C = \theta$.¹⁹ This verifies that the example satisfies Assumption 2. We now verify that the example satisfies Assumption 3. The second mixed-partial derivative is $\Pi_{12}^C(\alpha, A) = [f'(\alpha)/(1 - \theta)]\lambda(A\lambda\theta/w)^{\theta/(1-\theta)}$. Since $f'(\alpha) (> <) as $\alpha (< >)$ θ , it follows that $\Pi_{12}^C(\alpha^C(A), A) = 0$ (and therefore it is ≤ 0) while $\Pi_{12}^C(\alpha, A) < 0$ for all $\alpha > \alpha^C(A)$. Moreover, since $\text{sgn} \{d\alpha^C(A)/dA\} = \text{sgn} \{\Pi_{12}^C(\alpha^C(A), A)\}$, we see why $d\alpha^C(A)/dA = 0$.$$

Analysis of the continuum-type case for the power-function example (when $F = 0$)

The client's expected payoff if she rejects the offer α with probability r (and searches again) is: $(1 - r)\Pi^C(\alpha, B(\alpha)) + r(\Pi^C(\theta, B(\alpha)) - s)$. Thus, she will accept the offer α if $\Pi^C(\alpha, B(\alpha)) > \Pi^C(\theta, B(\alpha)) - s$ and reject the offer α if $\Pi^C(\alpha, B(\alpha)) < \Pi^C(\theta, B(\alpha)) - s$. She will be indifferent between accepting and rejecting the offer α if $\Pi^C(\alpha, B(\alpha)) = \Pi^C(\theta, B(\alpha)) + s$; in this event she will be willing to randomize between the strategies of accepting the offer of α and rejecting it in favor of seeking a second opinion.

¹⁹ Although $f''(\alpha)$ may be positive for sufficiently small α , we are not concerned with this portion of the space, since both the client and the lawyer want $\alpha \geq \alpha^C = \theta$.

Similarly, the first lawyer's payoff can be written as:
 $(1 - r(\alpha))\Pi^L(\alpha, A) + r(\alpha)\Pi^L(\theta, A)/2$.

The fact that α^C is constant at θ is a welcome simplification, since the resulting first-order condition for the lawyer is simpler than in the general case.²⁰

$$-r'(\alpha)[\Pi^L(\alpha, A) - \Pi^L(\theta, A)/2] + (1 - r(\alpha))\Pi_1^L(\alpha, A) = 0.$$

In equilibrium (along the equilibrium demand function), $A = B(\alpha)$; using this substitution to eliminate A from the equation above yields:

$$-r'(\alpha)u(\alpha) + (1 - r(\alpha))v(\alpha) = 0,$$

where $u(\alpha) \equiv [\Pi^L(\alpha, B(\alpha)) - \Pi^L(\theta, B(\alpha))/2]$ and $v(\alpha) \equiv \Pi_1^L(\alpha, B(\alpha))$. The solution of this ordinary differential equation through the boundary condition $r(\underline{\alpha}) = 0$ is given by:

$$r(\alpha) = 1 - \exp\left\{-\int_{\underline{\alpha}}^{\alpha} [v(t)/u(t)]dt\right\}, \text{ where the integral is over } [\underline{\alpha}, \alpha].$$

Note that any $\alpha \in [\underline{\alpha}, \alpha]$ is greater than θ since $\alpha^L(A) > \alpha^C(A) = \theta$ for all A . Since the ratio $v(\alpha)/u(\alpha) = [\alpha^{\theta/(1-\theta)}/(1-\theta)]/[\alpha^{1/(1-\theta)} - (1/2)\theta^{1/(1-\theta)}]$, integration and simplification yields:

$$r(\alpha) = 1 - [\underline{\alpha}^{1/(1-\theta)} - (1/2)\theta^{1/(1-\theta)}]/[\alpha^{1/(1-\theta)} - (1/2)\theta^{1/(1-\theta)}].$$

Analysis of the continuum-type case for a general probability function (when $F = 0$)

Recall that the first lawyer's payoff can be written as:

$$(1 - r(\alpha))\Pi^L(\alpha, A) + r(\alpha)\Pi^L(\alpha^C(B(\alpha)), A)/2.$$

That is, with probability $(1 - r(\alpha))$ the client accepts the contingent fee α , in which case the lawyer earns $\Pi^L(\alpha, A)$. But with probability $r(\alpha)$ the client rejects the offer α and seeks a second opinion, initiating an auction for the right to represent the client, so that the two lawyers then compete for client. Since the client's belief upon observing the offer α is that A is equal to $B(\alpha)$, the contingent fee that the client will most prefer – and, therefore, the contingent fee that both lawyers will “bid” – is $\alpha^C(B(\alpha))$. Thus, each lawyer expects to obtain the case with probability $1/2$, and to make $\Pi^L(\alpha^C(B(\alpha)), A)$ from the case should he obtain it.

Maximizing the first lawyer's payoff with respect to α yields the following first-order condition:

$$-r'(\alpha)[\Pi^L(\alpha, A) - \Pi^L(\alpha^C(B(\alpha)), A)/2] + (1 - r(\alpha))[\Pi_1^L(\alpha, A)]$$

²⁰ As shown below in the general case, $d\alpha^C(A)/dA$ enters the differential equation, thereby incorporating both the belief function and its derivative into the differential equation.

$$+ (r(\alpha)/2)[\Pi_1^L(\alpha^C(B(\alpha)), A)\alpha^{C'}(B(\alpha))B'(\alpha)] = 0.$$

Using the substitution $A = B(\alpha)$ to eliminate A from the equation above yields:

$$\begin{aligned} & -r'(\alpha)[\Pi^L(\alpha, B(\alpha)) - \Pi^L(\alpha^C(B(\alpha)), B(\alpha))/2] + (1 - r(\alpha))[\Pi_1^L(\alpha, B(\alpha))] \\ & + (r(\alpha)/2)[\Pi_1^L(\alpha^C(B(\alpha)), B(\alpha))\alpha^{C'}(B(\alpha))B'(\alpha)] = 0. \end{aligned} \quad (\text{A.1})$$

Recall that $\alpha^L(A)$ is a decreasing function (and thus so is $B(\alpha)$), while $\alpha^C(A)$ is decreasing (or constant, as in the algebraic example); moreover, recall that $\alpha^L(A) > \alpha^C(A)$ for all $A \in [\underline{A}, \bar{A}]$. Consequently, it follows that $\alpha > \alpha^C(B(\alpha))$ for all $\alpha \in [\underline{\alpha}, \bar{\alpha}]$. This further implies that all of the bracketed terms in equation (A.1) are positive for all $\alpha \in [\underline{\alpha}, \bar{\alpha}]$.

The solution of the ordinary differential equation (A.1) through the boundary condition $r(\underline{\alpha}) = 0$ is given by:

$$r(\alpha) = \int_{\underline{\alpha}}^{\alpha} p(t)z(t)dt/p(\alpha),$$

where

$$p(\alpha) = \exp\left\{\int_{\underline{\alpha}}^{\alpha} y(t)dt\right\},$$

$$y(t) = [\Pi_1^L(t, B(t)) - \Pi_1^L(\alpha^C(B(t)), B(t))\alpha^{C'}(B(t))B'(t)/2] / [\Pi^L(t, B(t)) - \Pi^L(\alpha^C(B(t)), B(t))/2],$$

and

$$z(t) = \Pi_1^L(t, B(t)) / [\Pi^L(t, B(t)) - \Pi^L(\alpha^C(B(t)), B(t))/2].$$

Since $p(\alpha)$ and $z(\alpha)$ are positive for all $\alpha \in [\underline{\alpha}, \bar{\alpha}]$, it follows that $r(\alpha) > 0$ for all $\alpha \in (\underline{\alpha}, \bar{\alpha}]$. From equation (A.1), it is clear that as long as $r(\alpha) < 1$ then $r'(\alpha) > 0$. Thus, $r(\alpha)$ starts at 0 and increases from there, continuing to increase as long as it is interior. If it remains interior at $\bar{\alpha}$, then it provides a separating equilibrium rejection function throughout the range of α (and thus throughout the range of A), and finishes with a jump upward to 1 for all $\alpha > \bar{\alpha}$. On the other hand, if $r(\alpha)$ reaches 1 for some $\alpha < \bar{\alpha}$, then there cannot be a fully-separating equilibrium throughout the range of A ; this latter scenario can be avoided if \bar{A} is not too large.

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 3. 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, $\underline{\alpha}$ 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 $n(\alpha) \equiv \Pi^L(\alpha, \underline{A}) - \Pi^L(1, \underline{A}) + s + \Pi^C(\alpha, \underline{A})$ 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 $\underline{\alpha} < 1$. We cannot rule out the possibility of a boundary solution at α^k (although there are parameter values that preclude it).

Comparative statics

At an interior solution, $\underline{\alpha}$ 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 power-function example, $\Delta'(\alpha) = \Delta(\alpha)/\alpha(1 - \theta)$; 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.

Three-type example

Finally, if there were, for example, 3 possible values of A , $\{\underline{A}, A_m, \bar{A}\}$, with $\underline{A} < A_m < \bar{A}$, then $\bar{\alpha} = 1$, $\alpha_m = (1 - s/[(1 - \theta)zA_m^{1/(1-\theta)}])^{(1-\theta)/\theta}$, and $\underline{\alpha} = (1 - s/[(1 - \theta)z\underline{A}^{1/(1-\theta)}])^{(1-\theta)/\theta}$. The fraction of the case that the lawyer purchases is increasing in case value, with only the highest-value case being purchased in full.