Equilibrium Contingent Fees
with
Heterogeneous Attorneys*

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ABSTRACT

This paper provides a signaling model to analyze the equilibrium fee structures arising when attorneys are heterogeneous with regard to unobservable ability. Unlike fixed fees, contingent fees are more profitable to attorneys who have a greater probability of winning, and thus may serve as an ability signal. It is shown that pooling equilibria are the only equilibria when high-ability attorneys do not have sufficient capacity to serve all consumers. For all pooling equilibria (i) both high- and low-ability attorneys charge the same simple contingent percentage fee, and (ii) the highs operate at capacity while the lows have excess capacity. In some equilibria, positive profits are earned by both types of attorneys despite the excess capacity.

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1. Introduction

In most personal injury lawsuits, the plaintiff’s attorney is paid on a contingent percentage fee basis. For such arrangements, the attorney receives a fixed fraction (typically one-third) of court-awarded damages if the case is won, and nothing if the case is lost. Over the years there has evolved a significant literature focusing on the performance of contingent fees in solving the various agency problems inherent in the attorney-client relationship.\(^1\) However, the literature has typically ignored the possibility that an attorney's fee structure might reveal information about the attorney, which is not directly observable. The present paper considers the implications of attorney heterogeneity on equilibrium fee structures when an attorney's ability is not verifiable.

A well-known characteristic of contingent fees is that, unlike fixed fees, they are more profitable for attorneys who have a relatively high probability of successful litigation. Furthermore, a contingent fee that is profitable for attorneys who have a high probability of winning a lawsuit (referred to as "high-ability attorneys" or "highs") may nevertheless be unprofitable for attorneys who have a low probability of winning (referred to as "low-ability attorneys" or "lows"). It is therefore plausible that high-ability attorneys might use contingent fees to signal their ability (in the sense of Spence, 1973). This intuition is consistent with the conclusions of Rubinfeld and Scotchmer (1993) who view the problem of choosing an attorney as one of adverse-selection.\(^2\) In general, the authors find that pooling does not occur as the contract accepted by the high-ability attorneys always entails a greater contingent fee than the one accepted by the low-ability attorneys.

This paper provides a signaling model to analyze the fee structures arising when attorneys are either high-ability or low-ability, and ability is unobservable. It finds the existence of both separating and pooling equilibria. The separating equilibria generally


\(^2\) There are several variations of their model, including a version in which plaintiffs are better informed about the quality of their cases than are attorneys. Only the version most relevant to the present model is discussed.
entail the high-ability attorneys charging contingent fees which are unprofitable for low-ability attorneys, with the latter exiting the industry. Uninformed consumers may thus infer the ability of attorneys by the fees charged, even though they cannot observe an attorney's type. However, separating equilibria exist only when the combined capacity of the highs is sufficient to serve all consumers (sometimes referred to as "clients").

When the combined capacity of the high-ability attorneys is not sufficient to serve the entire market, only pooling equilibria exist. For all pooling equilibria (i) both high- and low-ability attorneys charge the same simple contingent percentage fee (no fixed fees), and (ii) the highs operate at capacity while lows have excess capacity. Uninformed consumers are thus unable to infer an attorney's type in equilibrium. Despite the fact that the lows have excess capacity in equilibrium, both high and low-ability attorneys earn positive profits in some (but not all) of the pooling equilibria.

The pooling equilibria are consistent with the stylized fact that there is little variation in the fees charged by attorneys in civil suits. Indeed, a one-third contingent fee is sometimes referred to as the standard contingent fee. However, the present model does not allow for different types of cases. So while the model does provide some insight into why attorneys with different probabilities of winning might charge the same contingent fee, it cannot address why attorneys often charge the same fee for different cases.

One implication of the analysis is that contingent fee caps need not cause excess demand for legal services and may, in fact, increase the quality of legal services. The model also illustrates that a prohibition on contingent fees can harm consumers by allowing low-ability attorneys to remain in the market, even though these attorneys would not be able to effectively compete in contingent fees.

Now it is well known that signaling games are often plagued by a multiplicity of equilibria, some of which are supported by (arguably) unreasonable beliefs. The present model would also yield unreasonable equilibria if all consumers were uninformed. For example, if all consumers were uninformed, it would be possible to construct equilibria in which attorneys charged fixed fees even though, as discussed below, fixed fees are

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3 For example, Roesler (1996, p.85) comments that “lawyers and clients have accepted, as if it were ‘Written in the Wind,’ a one-third split as the Standard Contingency Fee.” See also Mallen and Smith (1996, p. 151), and Burnham (1995, p. 153).
inefficient. But fixed fees are never charged in equilibrium as long as a fraction of consumers are informed. More generally, the existence of even a small number of informed consumers permits a fairly sharp characterization of the equilibria, without resorting to refinements. Deviations which are not profitable when all consumers are uninformed and beliefs are very pessimistic (that is, if consumers believe that only a low-ability attorney would deviate) may nevertheless be profitable if even a small fraction of consumers know the true type of the deviating attorney. The end result is smaller set of equilibria.

As a final point, it should be mentioned that the equilibrium fee structures derived below (namely, simple contingent fees and no fixed fees) would not obtain if attorneys and clients were unrestricted in their contracting. Under the assumption that attorneys are risk-neutral and clients risk-averse, efficient risk sharing requires that the risks of litigation be borne by the attorney. Therefore, the most efficient contract is for the attorney to 'buy' the case from the plaintiff, which is formally equivalent to charging a 100% contingent fee and a negative fixed fee. However, such arrangements are not observed and, more importantly, considered to be unethical. The ABA Model Rules of Professional Conduct prohibits attorneys from acquiring a proprietary interest in a lawsuit, although 'reasonable' contingent fees are permitted. The Rules also prohibit the provision of financial assistance to a client in connection with a pending or contemplated lawsuit.\textsuperscript{4,5} To be consistent with these restrictions, attorneys are not permitted to 'buy' cases nor are they permitted to charge negative fixed fees (pay clients).

This paper has six sections, including this introduction. The model is specified in Section 2 and equilibrium results are established in Section 3. Section 4 considers the robustness of the pooling equilibria to changes in various modeling assumptions. Section 5 discuses the policy implications of the analysis, and concluding remarks are given in Section 6.

\textsuperscript{4} Rule 1.8 (e) and (j), as reported by Gillers and Simon (1995, pp. 103-4).

\textsuperscript{5} Santore and Viard (2001) give a political economy explanation for these restrictions, arguing that they benefit attorneys while harming clients.
2. The Model

2.1 Notation and timing

There are $A$ attorneys. The probability that a given attorney is a high-ability type (a 'high') is $z$, and the probability that an attorney is a low-ability type (a 'low') is $(1-z)$, where $1 > z > 0$. Ability is modeled as an attorney’s probability of winning a case. Highs win lawsuits with probability $P^H$ and lows win lawsuits with probability $P^L$, where $1 > P^H > P^L > 0$. The probability that an attorney is a high type is independent of the ability of any other attorney. The number of attorneys is assumed arbitrarily large so that, by the law of large numbers, there are $zA$ high-types and $(1-z)A$ low-types.

An attorney of type $t = H, L$ has the cost function

$$C_t(Q) = \begin{cases} c_t Q & \text{if} \quad Q \leq K_t^c \\ \infty & \text{if} \quad Q > K_t^c \end{cases}$$

In other words, $c_t$ and $K_t$ are the marginal cost and maximum capacity, respectively, for a attorney of type $t$. At this point, no restrictions are placed on the relative magnitudes of $K^H$ and $K^L$.

There are $N$ risk-averse consumers, each of whom has a potential lawsuit. There are $xN$ (where $0 < x < 1$) informed consumers who can observe the ability of an attorney, and $(1-x)N$ uninformed consumers who cannot determine an attorney's type. All consumers have the same strictly concave von Neumann-Morgenstern utility function, $v(\cdot)$, where $v'(\cdot) > 0$ and $v''(\cdot) < 0$. Without loss of generality, pre-settlement income and utility are both normalized to zero, $v(0) = 0$. I follow Rubinfeld and Scotchmer (1993) by assuming that each plaintiff who wins a lawsuit recovers damages, gross of attorney fees, in the amount of $D$.

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6 Allowing partnerships (or mergers) between attorneys would effectively make a firm's ability level a choice variable. That is, the average ability of attorneys within a given firm could be altered by manipulating the proportion of high- and low-ability attorneys.
Allowing heterogeneous cases introduces other asymmetric information issues. To focus on the possibility of signaling, these issues have been ignored. One interpretation of the present model is that nontrivial sunk costs must be incurred before an attorney can learn the true quality of a lawsuit. Once an attorney has incurred these sunk costs, it may be ex post optimal to pursue the lawsuit even if it is a 'bad' case.

Attorneys are risk-neutral and each charges a fee structure \((F, f)\) consisting of a nonnegative fixed fee \(F \geq 0\) and a contingent (that is, conditional on winning) percentage fee, \(f\), applicable to the gross recovery. The expected profit-margin for an attorney of type \(t\) if she charges \((F, f)\) is \(\pi'(F, f) \equiv [fP'D + F - c']\). The expected profit of a attorney of ability \(t\) who serves \(Q\) (\(\leq K'\)) clients is \(\Pi'(F, f, Q) = \pi'(F, f)Q\). An attorney who exits the industry earns zero profits.

It will be convenient to define \(f_t^0 \equiv \frac{c'}{P'D}\) as the simple contingent fee at which an attorney of type \(t\) earns zero profits. It is the contingent fee at which the expected revenue from accepting a case, \(fP'D\), equals the marginal cost, \(c'\).

The timing of the game is as follows:

**Stage 0**: Nature chooses the type of each attorney and the sequence in which consumers arrive at the market.

**Stage 1**: Attorneys simultaneously set fee structures of the form \((F, f)\). At the time fee structures are chosen, an attorney may exit the industry and earn zero profits.

**Stage 2**: Informed consumers sequentially choose from among the attorneys who have remained in the market, and who are not at capacity.\(^8\)

\(^7\) For example, if the attorney is better informed about the merits of the case than the client, then there may be moral hazard with regard to advice. This situation has been analyzed by Dana and Spier (1993).

\(^8\) If the highs can serve all consumers, the assumption that the informed consumers move first is innocuous since only highs serve consumers. However, for a pure-strategy equilibrium to exist in general, it is necessary that the informed consumers do not get rationed when they attempt to hire
**Stage 3:** Uninformed consumers sequentially choose from among a large random sample of attorneys of size $M$, who have remained in the market and are not at capacity. The uninformed do not know the order in which they arrive at the market.

The market is thick insofar as the number of attorneys, the number of consumers, and the number of observed attorneys, are each arbitrarily large. It is assumed that the combined capacity of all attorneys, $[zAK^H + (1-z)AK^L]$, is strictly greater than the number of consumers, $N$. The next assumption states that (i) the break-even contingent fee for a high is lower than the break-even contingent fee for a low; and that (ii) the lows can profitably serve clients.

Assumption 1: \[
\frac{c^H}{P^H D} < \frac{c^L}{P^L D} < 1
\]

Assumption 1 allows the highs to have greater marginal costs than the lows since $P^H > P^L$, although $c^H$ cannot be too much greater than $c^L$. Figure 1 indicates the reservation contracts for high- and low-ability attorneys, drawn for the case when $c^H > c^L$. Note that the break-even contingent percentage fee for the highs, $f^H_0$, is by Assumption 1 strictly less than the break-even contingent fee for the lows, $f^L_0$. As a result, the a high can charge a (simple) contingent fee which is unprofitable for a low, even if the lows have a cost advantage.

Note that the number of attorneys observed by uninformed consumers, $M$, is taken to be exogenous. It is also assumed that $M$ is sufficiently large so as to allow each attorney to be observed by a large number of informed consumers. Otherwise, the market would not be competitive. However, if $M$ is too large, then a technical issue arises from a high-ability attorney. Thus, the results would not change as long as the $xN$ informed consumers are among the first $zAK^H$ (the total capacity of the highs) consumers to move.

9 Otherwise, the equilibria are trivial; attorneys exploit the excess demand and extract maximum surplus by charging a contingent fee equal to 100% and a fixed fee equal to zero.

10 The probability that a given uninformed consumer observes a given attorney is $(M/A)$. And, by the law of large numbers, a given attorney will be observed by $N(1-x)(M/A)$ uninformed consumers.
the fact that the high-ability attorneys may be at capacity in a pooling equilibrium (discussed in Section 3.2). More specifically, if \( M \) is too large, an uninformed consumer may be able to infer whether or not one group of attorneys is at capacity upon “arriving” on the market. This would, in effect, allow the uninformed consumers to update their beliefs (about the probability of being served by a high-ability attorney) using the number of attorneys that remain available.

It is nevertheless more consistent with the signaling literature to have uninformed consumers make decisions based on their beliefs and the actions of attorneys, not the number of attorneys. Therefore, to rule out the possibility that the uninformed consumers update in this fashion the following assumption is maintained.

**Assumption 2:** \[ M < \min \{ zA, (1-z)A \} \]

Finally, to simplify and shorten the exposition, it will be convenient to ignore the case when the number of informed consumers is greater than the combined capacity of the high-ability attorneys.

**Assumption 3:** \[ N_x < zAK^H \]
When Assumption 3 is not satisfied, there can be no signaling because the high-ability attorneys are at capacity before the uninformed consumers reach the market.

2.2 Information and equilibrium

As discussed above, consumers are either informed or uninformed. The uninformed consumers have beliefs regarding a given attorney's type, which are a function of the fee structure charged by the attorney. Let the function $\beta(F, f)$ represent the probability that an uninformed consumer assigns to an attorney being high-ability, given that the attorney charges $(F, f)$. The belief function takes values on the unit interval $\beta(F, f) \in [0, 1]$.

The expected utility of a consumer who pays her attorney according to $(F, f)$ and has probability $\theta$ of winning her lawsuit is

$$V(F, f, \theta) = \theta \cdot v(D - f - D - F) + (1 - \theta) \cdot v(-F). \quad (1)$$

For a given belief function, $\beta(\cdot)$, the perceived probability of winning the lawsuit can be written as a function of the fee structure

$$\theta(F, f; \beta(\cdot)) = \beta(F, f)P^\text{H} + (1 - \beta(F, f))P^\text{L} \quad (2)$$

It follows that $\theta(F, f; \beta(\cdot)) \in [P^\text{L}, P^\text{H}]$ for any belief function.

Throughout the perfect Bayesian equilibrium concept is employed and only pure-strategy equilibria are considered. Since attorney types are independent, the probability that an attorney is a high is a function of the fee structure chosen by the attorney, but not the fee structures chosen by the other attorneys. Beliefs must be consistent with the equilibrium strategies which implies that, as long as an unexpected fee structure is not observed, consumers believe that the other players have adhered to their equilibrium strategies and consumers update their beliefs whenever possible using Baye's rule. The equilibrium strategies must also be sequentially rational. That is, an uninformed consumer must always choose the attorney who is believed to offer the greatest expected utility. When consumers are indifferent between multiple attorneys, they are assumed to choose randomly.

The analysis will focus throughout on symmetric pure-strategy equilibria in which each high charges the same fee structure, $(F_H^*, f_H^*)$, and each low who serve consumers charges the same fee structure, $(F_L^*, f_L^*)$. The qualifier “who serve consumers” is added
so as to not ignore equilibria in which a fraction of lows exit the industry. Thus, lows either serve consumers or exit in equilibrium.\(^{11}\)

The equilibrium quantity of consumers received, profit, and profit-margin for an attorney of type \(t\) will be denoted by \(Q_t^*, \Pi_t^*\) and \(\pi_t^*\), respectively, where for \(t = L\) it is understood that these are the values for the lows who serve consumers. The equilibria in which \((F_H^*, f_H^*) \neq (F_L^*, f_L^*)\) will be referred to as *separating*. The equilibria in which \((F_H^*, f_H^*) = (F_L^*, f_L^*)\) will be referred to as *pooling*. For pooling equilibria the subscripts on the equilibrium fees are dropped so that \((F^*, f^*) \equiv (F_H^*, f_H^*) = (F_L^*, f_L^*)\).

### 2.3 Indifference curves in fee space

The results to be presented in the following section follow in large part from the simple fact that the indifference curves of consumers (in fee space) have steeper slopes than the isoprofit-margin lines of attorneys at any given fee structure. It will therefore be convenient to derive this relationship before presenting the results.

First, calculate the slope of a consumer's indifference curve, \(\frac{df}{dF}\), by totally differentiating (1) with respect to \(F\) and \(f\)

\[
\frac{df}{dF} = -\frac{\theta \cdot v'(D - f \cdot D - F) + (1 - \theta) \cdot v'(-F)}{\theta \cdot D \cdot v'(D - f \cdot D - F)}. \tag{3}
\]

Then, using the concavity of \(v(\cdot)\), it is straightforward to show that

\[
\left| \frac{df}{dF} \right| = \begin{cases} > & \frac{1}{\theta \cdot D} \\ = & 1 \end{cases} \quad \Leftrightarrow \quad f = \begin{cases} < & 1 \end{cases}.
\tag{4}
\]

Thus, the indifference curve of a consumer who wins with probability \(\theta\) has a steeper slope than the isoprofit-margin line of an attorney who wins with probability \(\theta\), except at a full insurance contract (i.e., \(f = 1\)), in which case, the two slopes are equal.

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\(^{11}\) Focusing on symmetric pure-strategy equilibria is not without some loss of generality. However, since the market is assumed to be thick, any asymmetric pure-strategy equilibrium (in which attorneys of the same type charge different fees) can also be viewed as a symmetric mixed strategy equilibrium (in which the probability of choosing a given fee structure is equal to the fraction of highs adopting that pure-strategy). Thus, it is in the spirit of a pure-strategy analysis to ignore the asymmetric pure-strategy equilibria.
Figure 2 depicts an indifference curve for an uninformed consumer who hires an attorney of type $t$ as well as iso-profit margin lines for an attorney of type $t$. An important implication of (4) is that fee structures involving positive fixed fees are inefficient: For any fee structure with a positive fixed fee, such as $(F', f')$ in Figure 2, there exist simple contingent fees that yield greater expected utility to the client and greater expected profit to the attorney. Even simple contingent fees are less efficient than allowing the attorney to purchase the case, which would shift all of the risk to the risk-neutral attorney. However, as discussed in the introduction, it is illegal for attorneys to buy civil suits. Consequently, simple contingent fees are the most efficient fee structures that are permissible.

\[ h(F, f) \equiv \theta \cdot v(D - fD - F) \text{ is concave in } (F, f) \text{ and } g(F, f) \equiv (1-\theta) \cdot v(-F) \text{ is concave in } (F, f). \] It follows that for a given $\theta$ the upper-contour sets of $V(F, f, \theta)$ are convex.
3. Equilibrium Results

The fact that fixed fees do not efficiently allocate risk between the attorney and plaintiff leads one to suspect that only contingent fees will be offered in equilibrium. As shown by Proposition 1, this intuition is correct. In equilibrium, both high- and low-ability attorneys charge only simple contingent fees. However, as discussed later, this result only holds when a fraction of consumers are informed. If all consumers are uninformed it is possible to construct equilibria in which fixed fees are charged. Thus, the informed consumers can promote efficient risk sharing by assuring that only contingent fees are charged in equilibrium.

PROPOSITION 1: Positive fixed fees are never charged in equilibrium \((F_H^* = F_L^* = 0)\).

Proof. See Appendix A.

Sharper results may be obtained by restricting attention to specific parameter regions. Below the parameter space is partitioned into three regions. For parameters in Region 1, the high-ability attorneys have sufficient total capacity to serve all consumers \((N < z \cdot A \cdot K_H)\) and, as shown in Section 3.1, all equilibria are separating. However, if the highs cannot serve all consumers -- Regions 2 and 3 -- then only pooling equilibria exist. Thus, the total capacity of the high-ability attorneys is crucial to the qualitative nature of the equilibria. The distinction between the Regions 2 and 3 is postponed until Section 3.2, which characterizes the pooling equilibria.

3.1 Separating Equilibria

In this section separating equilibria are considered in which the highs signal their ability by charging contingent fees that are unprofitable for lows. Such equilibria exist if and only if the high-ability attorneys have sufficient total capacity to serve all consumers. Parameters satisfying this condition are defined as Region 1:13

13 It can be shown that a pure-strategy equilibrium does not exist when \(N = z \cdot A \cdot K_H\). To conserve space, this knife-edge case is ignored.
Region 1: \( N \leq z \cdot A \cdot K^H \)

For Region 1, the highs cannot be at capacity in any equilibrium. The existence of informed consumers thus causes Bertrand-like behavior in which the highs compete the contingent fee down to the level at which they earn zero profits, forcing the lows to exit.

PROPOSITION 2: If the high-ability attorneys have sufficient capacity to serve all consumers \( (N < z \cdot A \cdot K^H) \), all equilibria are separating with the low-ability attorneys exiting the market. The high-ability attorneys charge the simple zero-profit contingent fee \( f^*_H = f^0_H \).

The intuition behind the above proposition is straightforward, so only a sketch of the proof is given. By Proposition 1, it is legitimate to focus on equilibria in which only contingent fees are charged. And for parameters in Region 1 \( (N < z \cdot A \cdot K^H) \), the highs cannot be at capacity in any equilibrium. At the same time, a high-ability attorney can always attract \( K^H \) informed consumers by charging \( f^*_H - \varepsilon \), thereby undercutting the equilibrium fee charged by the other high-ability attorneys. Were it the case that \( f^*_H > f^0_H \), such a deviation would be profitable for sufficiently small \( \varepsilon > 0 \) (this is a standard argument in price games). Hence, competition forces the fees down to the level where the highs are earning zero profits. Assumption 1 implies that the lows cannot offer the same simple contingent fee without earning negative profits. Thus, the lows must exit since they cannot profitably offer a contract yielding the same utility level and the highs charge a break-even simple contingent fee.

One belief function capable of supporting the equilibrium behavior described in Proposition 2 is the following

\[
\beta^*(F, f) = \begin{cases} 
1 & \text{if } (F, f) \text{ is such that } \pi^L(F, f) < 0 \\ 
0 & \text{otherwise}
\end{cases}
\]

\[14\] Rubinfeld and Scotchmer (1993) find that when the search costs are sufficiently small, clients find it optimal to offer contracts that only a high-quality attorney would accept. Here competition between attorneys drives the fees down to a level that yields negative profits to a low.
The above beliefs are consistent with the equilibrium behavior since $\pi^L(0, f^H_0) < 0$ and only highs charge $f^H_0$. Furthermore, the behavior is optimal given the beliefs: In equilibrium, both informed and uninformed consumers receive utility $V(0, f^H_0, P^H)$, which is the maximum expected utility that can be achieved without attorneys earning negative profits. Therefore, no attorney has an incentive to deviate because it is impossible to attract consumers without earning negative profits.

One can therefore view the highs as having signaled their ability since the lows cannot profitably “fake” being a high. Note that this is true even if the highs do not have a cost advantage ($c^L < c^H$). Therefore, unlike fixed fees, contingent fees may allow the highs to signal their ability.

However, the qualitative nature of the equilibria changes dramatically if the highs do not have sufficient capacity to serve all consumers. In this case, separating equilibria do not exist.

**PROPOSITION 3:** If the combined capacity of the high-ability attorneys is less than the total number of consumers ($z \cdot A \cdot K^H < N$), then a separating equilibrium does not exist.

**Proof.** See Appendix A.

The intuition behind Proposition 3 is straightforward. For a separating equilibrium to exist the following necessary conditions must be satisfied: First, the uninformed consumers who go to a low must believe they are going to a low -- types are revealed by definition. Second, the lows must have excess capacity. Third, we must have $f^L_* = f^L_0$ otherwise the lows will have an incentive to undercut the other lows (the worst that can happen to a deviating attorney is the uninformed consumers interpret the deviation as being the action of a low). And, fourth, we must have $f^H_* < f^L_*$ otherwise the lows will have an incentive to imitate the highs (incentive compatibility must be satisfied).

However, if the above conditions are satisfied, a profitable deviation exists because a high could charge $f'$ such that $f^H_* < f' < f^L_*$ and still attract the uninformed consumers given that, for any belief function, we must have $\theta(F, f'; \beta(\cdot)) \in [P^L, P^H]$ which implies $V(0, f', \theta(0, f'; \beta^*)) > V(0, f^L_*, P^L)$. 

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In other words, uninformed consumers who would have otherwise been forced to go to low charging \( f_L^* \) prefer to go to the high charging \( f' \). Hence, it is impossible to construct a separating equilibrium.

### 3.2 Pooling Equilibria

In this section pooling equilibria are characterized and constructed for Regions 2 and 3. As mentioned above, the distinction between these two regions is whether or not the highs would be at capacity in a pooling equilibrium assuming that all lows remain in the market. Assume, just for the moment, that attorneys do not have capacity constraints, and consider the allocation of consumers when all attorneys remain in the market and charge the same fee. In this case each of the \( zA \) high-ability attorneys receive an equal number of the \( xN \) informed consumers, which is \( \frac{xN}{zA} \). Similarly, each of the \( A \) attorneys receives an equal number of the \( N(1-x) \) uninformed consumers, which is \( \frac{(1-x)N}{A} \).

Thus, as long as the parameters satisfy

\[
\frac{xN}{zA} + \frac{(1-x)N}{A} < K^H, \tag{5}
\]

the high-ability attorneys are not at capacity in a pooling equilibrium if all low-ability attorneys remain in the market.

Recall that Region 1 (discussed in Section 3.1) requires \( N \leq z \cdot A \cdot K^H \). Region 2 consists of a mutually exclusive set of parameters satisfying \( N > z\cdot A \cdot K^H \) and (5). In words, it is the set of parameters such that the highs cannot serve the entire market, but would receive less than \( K^H \) consumers if all attorneys charge the same fees and remain in the market.

Rearranging (5) yields an upper bound on \( N \), while the strict lower bound is given by \( N > z \cdot A \cdot K^H \).

**Region 2:** \( z \cdot A \cdot K^H < N < \left( \frac{z \cdot A \cdot K^H}{x + z(1-x)} \right) \). \tag{5'}

The right hand side of the above inequality which is the upper bound for \( N \) for parameters in Region 2. The left hand side of
When (5) does not hold, the highs would be at capacity in a pooling equilibrium assuming that all lows remain in the industry. Thus, the upper bound on Region 2 is the lower bound for Region 3. Thus, if (5) does not hold, we must have

\[
\text{Region 3: } \left( \frac{z \cdot A \cdot K^H}{x + z(1-x)} \right) \leq N.
\]

Finally, as discussed in Section 2.1, it is assumed that the highs have sufficient capacity to serve all informed consumers. Algebra confirms that Assumption 3 places a strict upper bound on \( N \) (specifically, it requires \( N < zAK^H /x \)) and that the set of parameters in Region 3 is non-empty. Figure 3 below illustrates the regions of parameters.

To assure the existence of an equilibrium for Regions 2 and 3, it is necessary to assume that the capacity for the highs is not too much greater than the capacity for the lows. Specifically, it is necessary to assume that

\[
\text{Assumption 4: } K^H - K^L < \left( \frac{x N}{z A} \right)
\]

Thus, the difference in capacity cannot be greater than the number of informed consumers received by a high-ability attorney when all attorneys charge the same fee. Otherwise, the lows 'fill up' before the highs in a pooling equilibrium, even though the highs serve both informed and consumers, while the lows serve only uninformed consumers. It follows that if the lows are at capacity \( Q_L^* = K^L \), then the highs are not at capacity \( Q_H^* < K^H \).

However, we cannot have a pooling equilibrium in which the highs have excess capacity, because the highs would then have a profitable deviation. A high could charge \( \varepsilon \)
less than the (hypothesized) equilibrium pooling fee, thereby attracting $K^H (> Q_h^*)$ informed consumers. As long as $\varepsilon > 0$ is sufficiently small, profits would increase. Hence, Assumption 4 is necessary for the existence of equilibrium, since, by Proposition 3, a separating equilibrium does not exist for Regions 2 and 3.\footnote{Recall that Assumption 4 was not necessary to establish Propositions 1, 2, and 3.}

**PROPOSITION 4:** For Region 2 parameters, all equilibria are pooling with a fraction of the low-ability attorneys exiting the market. The unique pooling contingent fee is $f^* = f_L^0$.\footnote{Recall that Assumption 4 was not necessary to establish Propositions 1, 2, and 3.} Furthermore, the highs operate at capacity ($Q_h^* = K^H$) and earn positive profits, while the lows who remain in the market have excess capacity ($Q_L^* < k^L$) and earn zero profits.

The intuition behind Proposition 4 is straightforward, so I only sketch the proof. As long as all lows remain in the market, which requires $f^* \geq f_L^0$, the highs will have excess capacity and, therefore, wish to undercut the equilibrium fee by charging $f' = f^* - \varepsilon$ (informed consumers would prefer to go to a high who charged $f'$). So it cannot be an equilibrium for all lows to remain in the market. On the other hand, if all lows were to exit, then some fraction of consumers will be rationed, which cannot occur in equilibrium. Therefore, in equilibrium only a fraction of lows must exit, which requires that those who remain earn zero profits. The equilibrium fee can thus be pinned down as the one at which the lows earn zero profits, $f^* = f_L^0$.

While the highs must be at capacity in equilibrium, the lows must have excess capacity. Were the lows who remain in the market at capacity, each attorney would essentially face a completely inelastic demand at all contingent fees less than 100% given that the other $(A-1)$ attorneys would not have the capacity to serve all $N$ consumers. But then an attorney facing an inelastic demand would find it profitable to charge $f' = 100\% - \varepsilon$, breaking the equilibrium. It is, therefore, necessary for the lows to have excess capacity in equilibrium.

With regard to how many lows must drop out, let $r$ denote the fraction of all lows that remain in the market. To assure that the highs are at capacity, $r$ must be small enough to satisfy
\[ K^H \leq \frac{N \cdot x}{z \cdot A} + \frac{N \cdot (1 - x)}{(z \cdot A) + r \cdot (1 - z)A}. \] (6)

The first term on the right-hand side of (6) is the number of informed consumers received by a high-ability attorney. The second term on the right-hand side of (6) is the number of uninformed consumers who would choose a given high-ability attorney assuming no capacity constraint. The sum of the two should thus be weakly greater than the capacity of a high. However, to guarantee that no consumers get rationed, \( r \) must be large enough to satisfy

\[ z \cdot A \cdot K^H + r(1 - z) \cdot A \cdot K^L \geq N. \] (7)

The above inequality merely requires that the combined capacity of the attorneys who remain in the market be sufficient to serve all \( N \) consumers. Let \( \tilde{r} \) be implicitly defined as the \( r \) at which (6) holds with equality, and let \( r \) be implicitly defined as the \( r \) at which (7) holds with equality. For parameters in Region 2, there exists an interval such that for all \( r \in (\tilde{r}, r] \), pooling equilibria exist in which \((1 - r)\) lows exit the industry. The interval is open from below because, as discussed above, the lows cannot be at capacity in equilibrium.

One simple belief function capable of supporting the pooling equilibrium at \( f^* = f^L_0 \) is\(^{16}
\[
\beta^* (F, f) = \begin{cases} 
1 & \text{if } (F, f) \text{ is such that } \pi^L (F, f) < 0 \\
n & \text{otherwise}
\end{cases}
\]

where \( z / [z + r \cdot (1 - z)] \) is the fraction of all attorneys remaining in the industry that are high ability. That is, the informed consumers must update their beliefs to reflect the fact that the equilibrium strategy for \([(1 - r)(1 - z)A]\) lows is to exit.

\[^{16}\text{ Simpler belief functions such as } \beta (F, f) = z / [z + r \cdot (1 - z)] \text{ for all } (F, f) \text{ also support the equilibrium, but are arguably unreasonable. That is, a refinement such as the Intuitive Criterion (Cho and Kreps, 1987) would rule out such beliefs on the grounds that a low would never wish to charge } (F', f') \text{ such that } \pi^L (F', f') < 0. \text{ Therefore, according to the Intuitive Criterion, uninformed consumers should believe that only a high would charge } (F', f') \text{ if } \pi^L (F', f') < 0. \]
No attorney charges fees such that $\pi^L(F,f) < 0$, so this is an out-of-equilibrium event and, therefore, the beliefs are consistent with the actions of attorneys. The fees charged are also optimal given the beliefs: The lows cannot charge fees that yield greater utility to uninformed consumers without earning negative profits since $f_L^0$ yields greater utility than any other $(F,f)$ such that $\pi^L(F,f) \geq 0$, holding constant the probability of winning. It is true that the highs can convince the uninformed that they are highs by charging a slightly lower fee, say $f' = f_L^0 - \varepsilon$, so that $\pi^L(0,f') < 0$. However, the highs are at capacity in equilibrium and have no incentive to charge lower fees. At the same time, charging a larger fee attracts no consumers for either type of attorney: The informed consumers would prefer one of the other high-ability attorneys charging $f_L^0$, and the uninformed consumers would prefer one of the other attorneys. (Recall that when an attorney deviates by charging a greater fee, the uninformed consumers continue to believe that with probability $z/[z + r(1-z)]$ the deviating attorney is a high).

Finally, the pooling equilibria for parameters in Region 3 are characterized. For these parameters a high would be at capacity in a hypothetical pooling equilibrium, assuming that all lows remain in the market. In this case, there exist an infinite number of pooling equilibrium contingent fees. It should be clear that one may construct a pooling equilibrium with $f^* = f_L^0$ in essentially the same manner as was done for Region 2, except that all lows may remain in the industry ($r = 1$). However, it may not be obvious that pooling equilibria with $f^* > f_L^0$ are also possible. Since the lows will have excess capacity it is possibility a low might attempt to attract more consumers by charging a contingent fee $f'$ such that $f^* > f' > f_L^0$. Indeed, this possibility remains even when beliefs are very pessimistic with regard to observing unexpected fees; a small enough fee may yield more utility than the pooling contract even if uninformed consumers believe that the deviator is a low.

**Proposition 5:** For parameters in Region 3, there exist pooling equilibria with $f^* > f_L^0$, in which both high- and low-ability attorneys earn positive profits. There also exist pooling equilibria with $f^* = f_L^0$, in which only high-ability attorneys earn positive profits. In all equilibria, the highs operate at capacity ($Q_H^* = K_H^*$) while the lows have excess capacity ($Q_L^* < K_L^*$).
Proof. Below a pooling equilibrium with \( f^* > f_L^0 \) is constructed. The argument is essentially the same for \( f^* = f_L^0 \).

Let all attorneys remain in the industry and charge the contingent fee \( f^* \equiv f_L^0 + \varepsilon \). I will show that these actions constitute an equilibrium for sufficiently small \( \varepsilon > 0 \), and for the following beliefs:

\[
\beta^*(F, f) = \begin{cases} 
1 & \text{if } (F, f) \text{ is such that } \pi^L(F, f) < 0 \\
0 & \text{otherwise} \\
z & \text{if } (F, f) \text{ is such that } \pi^H(F, f) \geq \pi^H(0, f^*) 
\end{cases}
\]

At equilibrium, informed consumers randomly choose from among the high-ability attorneys and the uninformed consumers randomly choose from among all attorneys. For Region 3 parameters, the highs receive \( K^H \) consumers, while the lows have excess capacity.

The stated beliefs are only moderately pessimistic with regard to how uninformed consumers view deviations. If an attorney charges a fee structure which would yield greater profits for a high, then uninformed consumers do not change their beliefs that the attorney is high with probability \( z \). However, if an attorney were to charge any \( f' \) such that \( f^* > f' > f_L^0 \), then uninformed consumers believe that the attorney is a low. This would seem reasonable since the highs are at capacity in equilibrium and therefore have no incentive to charge a lower fee.

It is also clear that, for these beliefs, neither type has an incentive to charge a larger fee, say, \( f' > f^* \). Informed consumers would rather hire one of the other high-ability attorneys charging \( f^* \), than one who charges \( f' > f^* \). And, given that \( \beta^*(0, f') = \beta^*(0, f^*) = z \), uninformed consumers would not hire the attorney who deviates.

Nevertheless, it is possible that a low might be able to attract uninformed consumers by charging \( f' \) such that \( f^* > f' > f_L^0 \) if consumers would prefer to hire a low who charges \( f' \) to hiring an attorney who adheres to the equilibrium by charging \( f^* \). That is, a necessary (but not sufficient) condition for \( f' \) to be a profitable deviation for a low is that

\[
V(0, f', P^L) > V(0, f^*, zP^H + (1-z)P^L).
\]

And, since \( f' > f_L^0 \), a necessary condition for the above to hold is that
\[ V(0, f^*_L, P_L) > V(0, f^*, zP^H + (1-z)P_L) \]  

(9)

However, the above does not hold for \( f^* = f^*_L \), which, by the continuity of \( V(\cdot) \), implies that it does not hold for \( f^* \) sufficiently close to \( f^*_L \). It can thus be concluded that for \( f^* \) sufficiently close to \( f^*_L \), a low does not have a profitable deviation.

4. Robustness Issues

This section explores the robustness of the pooling equilibria by considering the implications of altering the model’s most crucial assumptions.

4.1 Informed Consumers

The assumption that a fraction of consumers are informed acts much like an equilibrium refinement, reducing the set of equilibria (without imposing restrictions on beliefs). However, the informed consumers are not necessary for the existence of pooling equilibria. On the contrary, without informed consumers, there also exist inefficient pooling equilibria in which both highs and lows charge the same fixed fee. (Fixed fees are inefficient because they shift all of the risk to the risk-averse consumer.) Beliefs that are very pessimistic when deviations are observed can support equilibria of this sort. For example, if consumers believe that only low-ability attorneys would deviate from the equilibrium, neither type of attorney may find it optimal to deviate.
4.2 Fixed Capacity and Blockaded Entry

Throughout the analysis it was assumed that attorneys are subject to a capacity constraint. An immediate corollary of Proposition 2 is that all equilibria are separating when there is no capacity constraint. Hence, the existence of capacity constraints is critical for the existence of pooling equilibria.

A related issue is whether pooling equilibria are consistent with entry. Consider a modified game in which attorneys first enter and then play the game described in the paper. If there are sufficiently many highs to serve the entire market, a pooling equilibrium will not obtain. On the other hand, as long as the highs are in scarce supply (that is, there are too few highs to serve the entire market), one would expect to see pooling equilibria.

4.3 Conspicuous Expenditures

The fact that high-ability attorneys earn greater profits than the low-ability attorneys leads one to ask whether conspicuous expenditures (advertising, expensive offices, expensive artwork, etc...) can be a credible signal of ability. Here the basic idea is that only high-ability attorneys can afford to make such expenditures. Though the decision to "burn money" is not formally modeled, it is possible to see that spending money on unproductive activities could not be an equilibrium outcome. Suppose, on the contrary, that it were possible for the highs to burn enough money to convince uninformed consumers that they are, in fact, high ability. Then a profitable deviation exists for high-ability attorneys. Specifically, a high can profitably deviate from the hypothesized equilibrium by charging a slightly smaller fee than the other highs and choosing to not burn money. This strategy attracts informed consumers and increases profits for a sufficiently small cut in fee. Thus, even if such signaling were possible when all consumers are uninformed, the existence of informed consumers precludes the possibility as an equilibrium outcome.
4.4 Negative Fixed Fees

The above analysis has restricted the contract space by prohibiting negative fixed fees. Given that attorneys are assumed to be risk-neutral and clients risk-averse, the unrestricted outcome is that attorneys ‘purchase’ claims from clients by charging a 100% contingent fee and a negative fixed fee. Once such full-insurance contracts are allowed, an attorney’s type is irrelevant – all that matters to the client is the amount that the attorney will pay for the lawsuit. Hence, the model becomes analogous to a Bertrand price-setting game.

Assumption 1 implies that the maximum a high would pay for a lawsuit, \((P^H D - c^H)\), is greater than the maximum a low would pay for a lawsuit, \((P^L D - c^L)\). It follows that if the highs can serve the entire market, competition for lawsuits will cause the highs to ‘pay’ \((P^H D - c^H)\), forcing the lows to exit. However, if the highs cannot serve the entire market, lawsuits will be purchased for \((P^L D - c^L)\). At this price the highs earn rents while the lows earn zero profits.\(^{17}\)

4.5 Screening with Non-Negative Fixed Fees

As discussed in the introduction, the present results differ qualitatively from Rubinfeld and Scotchmer (1993), who find that pooling will not occur. This section considers whether pooling can be an equilibrium outcome in a screening model, such as the one used by Rubinfeld and Scotchmer, when clients are not permitted to offer contracts that involve negative fixed fees.

Here uninformed clients are assumed to visit an attorney and offer a menu of contracts, \(\{\phi, \phi'\} = \{(F, f), (F', f')\}\), where it is permissible to have \(\phi = \phi'\). The only

\(^{17}\) At a lower price, the lows could not purchase a lawsuit without losing money, implying that some consumers would not get served. At a higher price, lows earn a positive profit and there is excess capacity. However, the highs must be at capacity in equilibrium, so the price must yield zero profits to a low making them indifferent between serving consumers and exiting.
restriction on the contracts is that the fixed fees must be non-negative. Attorneys do not have capacity constraints and the high-ability attorneys are fraction $z$ of all attorneys.

If search costs are negligible, the optimal strategy for consumers is to offer the menu \{(0, f^{0}_H), (0, f^{0}_H)\}, where \(f^{0}_H = c^{H}/(P^{H}D)\). This menu assures that consumers are served by a high-ability attorney since, by Assumption 1, the lows earn negative profit at \(f^{0}_H\). Furthermore, this simple contingent fee contract yields maximum utility to consumers, subject to the constraint that highs earn nonnegative profit. This result is analogous to Proposition 3 in Rubinfeld and Scotchmer (1993, p. 352), which states that “if the search cost is zero, there is, in general, an equilibrium in which only one type of attorney serves clients, and the contingent fee fraction is…1.”

As the above discussion shows, the prohibition on negative fixed fees does not alter a consumer’s ability to screen the low-ability attorneys. And, as long as search costs are small, it will be optimal for consumers to continue to search for a high-ability attorney. However, if search costs are sufficiently high, it will be optimal for consumers to offer a menu of contracts such that both types of attorneys will accept.\textsuperscript{18} Proposition 4 in Rubinfeld and Scotchmer (1993) addresses this possibility by showing that “if a client offers a menu of contracts that both types of attorney would accept, the client’s preferred menu does not, in general, pool types.” It turns out that with a prohibition on negative fixed fees, a client’s optimal menu of contracts that both types of attorney would accept may indeed pool types. As shown in Appendix B, pooling is optimal when either the fraction of high-ability attorneys is small, or the difference in ability levels is small.

5. Policy Implications

The above analysis can also shed additional light on two policy issues that have received much debate: contingent fee caps and contingent fee prohibition. Standard thinking about price ceilings, such as contingent fee caps, is that they cause excess demand and drive out high-quality products. However, the present model shows that one must be cautious in making the same predictions when attorneys differ in their abilities and are compensated on a contingent basis. Recall that there exist pooling equilibria in

\textsuperscript{18} See Proposition 5 in Rubinfeld and Scotchmer (1993, p. 353).
which the equilibrium contingent fee allows positive profits for each type of attorney (Proposition 5). For these equilibria, a cap on contingent fees need not cause a decrease in the supply of legal services as long as the cap is above the break-even contingent fee for a low-ability attorney; rather, the cap merely transfers surplus from the attorney to the client.

On the other hand, if the cap does decrease the supply of legal services (which requires that it is lower than the break-even fee for a low), it will do so by restricting the supply of low-ability attorneys. Hence, a cap on contingent fees will tend to increase the quality of legal services by decreasing the number of low-ability attorneys. Of course, since pooling equilibria require that the highs cannot serve the entire market, there will be excess demand. However, one can easily envision a model with three or more (each winning with different probabilities of winning a case) exhibiting similar pooling equilibria as long as the highest ability attorneys are capable of serving all informed consumers. Since there is excess supply in the pooling equilibria, a cap on contingent fees need not cause excess demand. Instead, the cap would force the lowest ability attorneys out of the market.

As for a prohibition on contingent fees, it is already well known that such a policy would have significant drawbacks. In addition to allowing for an efficient transfer of risk from a risk-averse client to the risk neutral attorney, contingent fees also give liquidity constrained clients access to the legal system. However, academics have not given much attention to the fact that contingent fees can improve the quality of legal services by forcing low-ability attorneys out of the market. For example, if high-ability attorneys have weakly greater costs than the low-ability attorneys (perhaps because they have greater opportunity costs of time), then prohibiting contingent compensation prevents the highs from signaling their ability. This follows from the fact that the lows can profitably match any fixed fee charged by a high. Thus, the present model suggests that a prohibition on contingent compensation might decrease the quality of legal services, especially if the high-ability attorneys can serve the entire market.
6. Conclusion

This paper has provided a signaling model to analyze the fee-setting behavior of personal-injury attorneys who differ in their abilities. Unlike fixed fees, contingent fees are more profitable to attorneys who have a greater probability of winning, and thus can serve as an ability signal. It was shown that the use of contingent fees may allow equilibrium separation with high-ability attorneys charging contingent fees that are unprofitable for those with low ability. Therefore, one implication of the analysis is that a prohibition on contingent fees may harm consumers by allowing low-ability attorneys to remain in the market, even though these attorneys would not be able to effectively compete in contingent fees.

It was also shown that when the high-ability attorneys cannot serve the entire market, all equilibria are pooling with both types of attorney charging the same contingent fee. For these equilibria, the highs operate at capacity, serving both informed and uninformed consumers, while the lows serve only uninformed consumers and have excess capacity. Despite the fact that the lows have excess capacity, it remains possible for all attorneys to earn positive equilibrium profits. Hence, a cap on contingent fees may transfer surplus from attorneys to clients without causing excess demand for legal services.
Appendix A: Proofs of the Propositions

Proof of Proposition 1.

The proof consists of two parts: The first part shows that there does not exist a pooling equilibrium in which attorneys charge fixed fees. The second part shows that there does not exist a separating equilibrium in which either the highs or the lows charge fixed fees.

Consider a pooling equilibrium in which attorneys charge \((F^*, f^*)\) and suppose, contrary to the proposition, that \(F^* > 0\). It will be shown that a profitable deviation exists for any hypothesized equilibrium belief function \(\beta^*\).

Define \(f'\) by \(V(0, f', P^H) = V(F^*, f^*, P^H)\) so that informed consumers prefer to hire a high-ability attorney who charges \((0, f' - \varepsilon)\) to hiring one who charges \((F^*, f^*)\).

Furthermore, as illustrated in Figure 2, the assumption that consumers are risk averse implies \(f' > f^*\) (the notation in the figure differs from that used here). Consumers would prefer to pay a larger simple contingent fee to avoid taking the risk of paying a fixed fee and losing the case.

The previous paragraph implies that a high-ability attorney who charges the simple contingent fee \(f = f' - \varepsilon\) will attract \(K^H\) informed consumers. Given that we must have \(Q_h^* \leq K^H\), a sufficient condition for this deviation to be profitable is

\[
K^H \pi^H(0, f' - \varepsilon) > K^H \pi^H(F^*, f^*)
\]  
(A1)

Thus, a high-ability attorney will earn greater profits by charging \(f = f' - \varepsilon\) as long as

\[
\pi^H(0, f' - \varepsilon) > \pi^H(F^*, f^*)
\]  
(A2)

However, as calculated in equation (4), consumers have steeper marginal rates of substitution than attorneys (refer to Figure 2), which implies that

\[
\pi^H(0, f') > \pi^H(F^*, f^*)
\]  
(A3)

The continuity of \(\pi^H(F, f')\) and (A3) together imply that (A2) holds for sufficiently small \(\varepsilon > 0\). Consequently, a high-ability attorney would have a profitable deviation, contradicting the assumption of equilibrium. We can conclude that there does not exist a pooling equilibrium in which fixed fees are charged.
Now, contrary to the proposition, suppose that a separating equilibrium exists in which \( F_{H}^* > 0 \). Then, once again it is possible to reach a contradiction by showing that a high could increase profits by charging a simple contingent fee which yields greater utility to informed consumers and a greater profit-margin for the attorney. A formal argument will not be given as it is identical to the one used above to show that fixed fees will not be charged in a pooling equilibrium. The conclusion is that there does not exist a separating equilibrium in which fixed fees are charged by high-ability attorneys.

Finally, contrary to the proposition, suppose that a separating equilibrium exists in which the low-ability attorneys charge \( F_{L}^* > 0 \) and serve \( Q_{L}^* > 0 \) consumers. (As discussed in the text, it is assumed that lows either serve consumers or exit, so \( F_{L}^* > 0 \) implies that \( Q_{L}^* > 0 \).) Let \( \beta^* \) be the belief function supporting the equilibrium.

For beliefs to be consistent with equilibrium behavior we must have \( \beta^*(F_{L}^*, f_{L}^*) = 0 \). Define \( f' \) by \( V(0, f', P^L) = V(F_{L}^*, f_{L}^*, P^L) \). It follows that a low-ability attorney can offer greater utility to the uninformed consumers by charging \( (0, f' - \varepsilon) \)

\[
V(0, f' - \varepsilon, \theta(0, f' - \varepsilon; \beta^*)) \geq V(0, f' - \varepsilon, P^L) \geq V(F_{L}^*, f_{L}^*, P^L),
\]

where the left-most inequality follows from the fact that \( \theta(F, f; \beta^*) \in [P^L, P^H] \), and the right-most inequality follows from the definition of \( f' \) and the fact that \( V \) is decreasing in the contingent fee. Thus, a low-ability attorney who charges the simple contingent fee \( f = f' - \varepsilon \) will attract \( K^L \) uninformed consumers.

Using arguments similar to those used above (for the pooling equilibrium case), it can be shown that there exists a sufficiently small \( \varepsilon > 0 \), such that a low-ability attorney who charges \( f = f' - \varepsilon \) will earn greater profits. Consequently, a low-ability attorney would have a profitable deviation, contradicting the assumption of equilibrium. We can conclude that there does not exist a separating equilibrium in which fixed fees are charged by low-ability attorneys.

Q.E.D.

Proof of Proposition 3.

Suppose that \( z \cdot A \cdot K^H < N \) and that, contrary to the proposition, a separating equilibrium does exist. By Proposition 1 we know that both types must charge simple
contingent fees. Let $f_{H}^{*}$ and $f_{L}^{*}$ denote the separating equilibrium fees, and let $\beta^{*}(\ )$ denote the equilibrium belief function. For beliefs to be consistent requires $\beta^{*}(0,f_{L}^{*}) = 0$ and $\beta^{*}(0,f_{H}^{*}) = 1$.

First note that if the low-ability attorneys did not serve consumers in equilibrium, then $(N - zA KH)$ consumers would get rationed. However, this cannot happen in equilibrium since the rationed consumers would prefer to pay a contingent fee that is less than 100%, rather than not go to court. Hence, a low-ability attorney could earn positive profits by charging any fee greater than $f_{L}^{0}$, but less than 100%. Of course, the existence of a profitable deviation would contradict the assumption of equilibrium. Therefore, low-ability attorneys must serve consumers in any separating equilibrium when $N > zA KH$. (Note it does not follow and is not necessary for the present argument that all lows serve a strictly positive number of consumers)

There are now two cases to consider: Either $f_{H}^{*} < f_{L}^{*}$, or $f_{H}^{*} > f_{L}^{*}$.

**Case 1:** Suppose that $f_{H}^{*} < f_{L}^{*}$, which implies $V(0,f_{H}^{*}, P^{H}) > V(0,f_{L}^{*}, P^{L})$. Here each informed consumer must choose a high-ability attorney. By Assumption 3 the highs will have remaining capacity after the informed consumers have moved. Thus, the first uninformed consumers arriving to the market will observe attorneys charging $f_{H}^{*}$ and attorneys charging $f_{L}^{*}$. Since beliefs must be consistent with equilibrium behavior, the first $(zA KH - xN)$ uninformed consumers will choose attorneys charging $f_{H}^{*}$, rather than $f_{L}^{*}$, because $V(0,f_{H}^{*}, P^{H}) > V(0,f_{L}^{*}, P^{L})$. However, the last $(N - zA KH)$ uninformed consumers arriving to the market will observe only attorneys charging $f_{L}^{*}$, and must believe that these attorneys are lows. I now show that this cannot be an equilibrium because a profitable deviation necessarily exists for a high.

For any equilibrium belief function, a high-quality attorney could charge $f'$ such that $f_{H}^{*} < f' < f_{L}^{*}$ and still attract the uninformed consumers who would have otherwise been forced to go to an attorney charging $f_{L}^{*}$. Specifically, note that the expected utility from choosing the attorney who charges $f'$ must be greater than $V(0,f_{L}^{*}, P^{L})$, which is the expected utility from choosing an attorney who chooses $f_{L}^{*}$ when beliefs are consistent:

$V(0,f', \theta(0, f'; \beta^{*})) \geq V(0,f', P^{L}) > V(0,f_{L}^{*}, P^{L})$. 

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The left-most inequality follows from \( \theta(0, f'; \beta^*) \in [P_L, P_H] \) and the right-most inequality follows from \( f' < f_L^* \). That is, even if beliefs are very pessimistic so that \( \beta^*(0, f') = 0 \), uninformed consumers would nevertheless prefer to go to the deviating attorney rather than an attorney charging \( f_L^* \). Therefore, a high-ability attorney could attract \( K_H^* \) uninformed consumers while charging a higher fee, thereby earning greater profits. The existence of a profitable deviation contradicts the assumption of equilibrium. Thus, we cannot have a separating equilibrium with \( f_{h*}^* < f_L^* \).

Case 2: Now consider the case when \( f_{h*}^* > f_L^* \). I first argue that in any separating equilibrium a consumer's expected utility from choosing a high, \( V(0, f_{h*}^*, P_H) \), must be weakly greater than the expected utility from choosing a low, \( V(0, f_L^*, P_L) \). Suppose, on the contrary, that \( V(0, f_{h*}^*, P_H) < V(0, f_L^*, P_L) \) in a separating equilibrium. Then, by sequential rationality, both informed and uninformed consumers would prefer the attorneys who charge \( f_L^* \) to the attorneys who charge \( f_{h*}^* \). Clearly, we cannot have an equilibrium in which the highs serve no customers, so \( Q_{h*} > 0 \). However, given consistent beliefs, it would only be rational for a consumer to choose an attorney who charges \( f_{h*}^* \), if there are no attorneys charging \( f_L^* \). It follows that the lows must be at capacity, \( Q_{l*} = K_L^* \), and that the highs must have excess capacity, \( Q_{h*} < K_H^* \). Hence, the last \( (N - (1 - 2)A K_L^*) \) uninformed consumers arriving to the market must choose a high ability consumer.

However, for any belief function \( \beta^* \), a low could increase profits by charging \( f_{L*}^* + \varepsilon \), where \( \varepsilon \) is positive and sufficiently small, as long as an uninformed consumer prefers hiring an attorney charging \( f_{L*}^* + \varepsilon \) to hiring an attorney charging \( f_{h*}^* \) (who is believed to be a high). More precisely, charging \( f_{L*}^* + \varepsilon \) is profitable if

\[
V(0, f_{L*}^* + \varepsilon; \theta(0, f_{L*}^* + \varepsilon; \beta^*)) > V(0, f_{h*}^*, P_{h*}), \tag{A4}
\]

where the left-hand side of the inequality is the expected utility for an uninformed consumer if she chooses the attorney charging \( f_{L*}^* + \varepsilon \). Given that \( \theta(F, f; \beta^*) \in [P_L, P_H] \) and, by hypothesis, \( V(0, f_{h*}^*, P_{h*}) < V(0, f_{L*}^*, P_{L}) \), inequality (A4) holds for \( \varepsilon = 0 \). Since \( V \) is continuous in \( f \), it follows that the inequality continues to hold for sufficiently small \( \varepsilon > 0 \). This means that charging a slightly higher fee is a profitable deviation for a low,
thereby contradicting the assumption of equilibrium. Thus, if a separating equilibrium exists in which \( f_{H}^* > f_{L}^* \), it must be that \( V(0, f_{H}^*, P^H) \geq V(0, f_{L}^*, P^L) \).

For the last part of the argument suppose, contrary to the proposition, that a separating equilibrium in which \( f_{H}^* > f_{L}^* \) does exist. Now there are two possibilities to consider, either the lows are earn positive profits in equilibrium, or they earn zero profits. If the lows are earning zero profits, so that \( \pi^L(0, f_{L}^*) = 0 \), then a low could increase profits by charging \( f = f_{H}^* > f_{L}^* \) (that is, by 'impersonating' a high) since doing so allows a positive profit margin and will attract a positive number of uninformed consumers.

The second possibility is that the lows earn positive profits, so that \( \pi^L(0, f_{L}^*) > 0 \), then it must be that all lows have remain in the market and serve consumers. It follows that either lows or highs must have excess capacity.

If the highs have excess capacity, then a high could charge \( f' = f_{H}^* - \varepsilon \), which attracts \( K^H \) informed consumers. For sufficiently small \( \varepsilon > 0 \) charging \( f' \) increases profits because the decrease in the profit margin can be made arbitrarily small, while the increase in consumers is finite.

If the lows have excess capacity, then a low could charge \( f' = f_{L}^* - \varepsilon \), which attracts \( K^L \) uninformed consumers since, even if beliefs are very pessimistic, the fact that that \( \Theta(F, f^*; \beta^*) \in [P^L, P^H] \) implies

\[
V(0, f_{L}^* - \varepsilon, \Theta(0, f_{L}^* - \varepsilon; \beta^*)) > V(0, f_{L}^*, P^L).
\]

For sufficiently small \( \varepsilon > 0 \) charging \( f' \) increases profits because the decrease in the profit margin can be made arbitrarily small, while the increase in consumers is finite. Thus, a low would wish to deviate, thereby contradicting the assumption of equilibrium.

To summarize, for \( N > zA \cdot K^H \) a separating equilibrium does not exist.

\[ Q.E.D. \]
Appendix B: Screening with Non-Negative Fees

First, note that conditional on it being optimal to offer pooling contracts, the consumer will always offer a simple contingent fee contract:19 Specifically, the optimal pooling menu is \( \{ \phi_P, \phi_P \} = \{(0, f^0_L), (0, f^0_L)\} \), where \( f^0_L = c^L/(P^L D) \). Let \( \{ \phi_H, \phi_L \} \) denote the optimal menu such that the highs choose \( \phi_H \) and the lows choose \( \phi_L \). It is straightforward to show that (i) the high contract consists of a simple contingent fee, (ii) \( \phi_H \) and \( \phi_L \) are equally profitable to a high, and (iii) \( \phi_L \) yields zero profit to a low. It is possible to rank the expected utility of consumers at each contract as follows

\[
\]

We wish to show that pooling is a possible equilibrium outcome. To simplify the exposition, it is assumed that \( c^H = c^L = c \). For any \( \phi_H = (0, f_H) \), conditions (i) and (ii) require

\[
f_H P^H D - c = f_L P^H D + F^L - c \quad \text{(B1)}
\]

and condition (iii) requires

\[
f_L P^L D + F^L - c = 0 \quad \text{(B2)}
\]

It is thus possible to solve (B1) and (B2) for \( f_L \) and \( F_L \) in terms of \( f_H \), yielding

\[
f_L(f_H) = \frac{f_H P^H D - c}{(P^H - P^L) D} \quad \text{and} \quad F_L(f_H) = \frac{P^H(c - f_H P^L D)}{(P^H - P^L)}
\]

To find the optimal pair of screening contracts one can first solve the following for \( f_H^* \) and then use \( \phi_L = (F_L^*, f_L^*) = (f_L(f_H^*), F_L(f_H^*)) \).

\[
Max \quad z \cdot V((0, f_H^*), P^H) + (1-z) V((f_L(f_H^*), F_L(f_H^*)), P^L)
\]

Note that when \( f_H = \frac{c}{P^L D} \), the optimal screening contract reduces to the optimal pooling contract since \( f_L(\frac{c}{P^L D}) = \frac{c}{P^L D} \) and \( F_L(\frac{c}{P^L D}) = 0 \). Hence, pooling is optimal if and only if the solution is \( f_H^* = \frac{c}{P^L D} \). The first-order condition is

\[19\] Any pooling menu with fixed fees is dominated by a separating menu in which the highs earn the same profit, but are paid a simple contingent fee.
\[
\frac{z}{\partial f_H} \frac{\partial V((0, f_H), P_H^*)}{\partial f_H} + (1 - z) \left( \frac{\partial V((f_L, f_H), F_L, (f_H), P_L^*)}{\partial f_L} \frac{df_L}{df_H} + \frac{\partial V((f_L, f_H), F_L, (f_H), P_L^*)}{\partial F_L} \frac{dF_L}{df_H} \right) \tag{B3}
\]

where
\[
\frac{\partial V((0, f_H), P_H^*)}{\partial f_H} = -P_H^* Dv'(1 - f_H)D
\]
\[
\frac{\partial V((f_L, f_H), F_L, (f_H), P_L^*)}{\partial f_L} \frac{df_L}{df_H} = -\frac{P_H^* P_L^* D}{P_H^* - P_L^*} v'(1 - f_L)D - F_L
\]
\[
\frac{\partial V((f_L, f_H), F_L, (f_H), P_L^*)}{\partial F_L} \frac{dF_L}{df_H} = \frac{P_H^* P_L^* D}{P_H^* - P_L^*} \left[ P_L^* v'(1 - f_L)D - F_L + (1 - P_L^*) v'(-F_L) \right]
\]

Using these expressions to simplify, the first-order condition reduces to
\[
-z P_H^* Dv'(1 - f_H)D + (1 - z) \frac{P_H^* P_L^* D}{P_H^* - P_L^*} \left[ v'(1 - f_L)D - v'((1 - f_L)D - F_L) \right] = 0 \tag{B3'}
\]

The first term is negative and the concavity of \(v(\cdot)\) implies that the second term is positive.

Pooling is optimal if and only if (B3') is non-negative when evaluated at \(f_H = f_L^0\).
\[
\frac{c}{P_L^* D}, \text{ which implies } f_L(f_L^0) = f_L^0 \text{ and } F_L(f_L^0) = 0. \text{ So, pooling is optimal if and only if}
\]
\[
-z v'(1 - f_L^0)D + (1 - z) \frac{P_L^*}{P_H^* - P_L^*} \left[ v'(1 - f_L^0)D - v'((1 - f_L^0)D) \right] \geq 0 \tag{B3''}
\]

The first term is negative, while the second term is positive. As \(z\) approaches zero, the first term gets arbitrarily small but the second grows and remains positive. Therefore, as \(z\) gets close to zero, pooling is optimal. Similarly, if \(P_H^*\) is sufficiently close to \(P_L^*\), the second term gets arbitrarily large, implying that pooling is optimal.
References


Roesler, John, 1996, How to Find the Best Lawyers... and Save Over 50% on Legal Fees, Santa Fe, NM: The Message Company.

