Admissible Third Party Litigation Funding Contracts as a way to Constrain the Exploitation of Plaintiffs*

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December 2011

Abstract

Third party litigation funders provide non-recourse loans to plaintiffs who repay these loans if and only if they prevail. This means that the interest rates funders charge reflect the funder's information about the strength of the plaintiff's case. We analyze a signaling model in which the plaintiff can introduce its funding contract as evidence. If the funder's information or evaluation is informative, then funder's have an incentive to signal that the plaintiff has a strong case to increase their chance of recovery. We show that there exists a separating equilibrium in which the funder's information is fully-revealed. Furthermore, under some conditions, the need to signal forces the funder to charge plaintiffs a lower interest rate and increases the probability of efficient loans taking place.

1 Introduction

In 2006, Joseph Gill was falsely arrested by the police and left with a serious back injury. While his lawsuit against the police department was pending he needed money, and so he borrowed $4,000 dollars via two loans from Lawbuck$, a Brooklyn based litigation financing firm that advances money to plaintiffs and only requires repayment if the plaintiff wins his case or receives a settlement. Fortunately for Mr. Gill, the city settled the case for $500,000 after a jury found in his favor, but after his victory LawBuck$ demanded repayment of the money it had loaned him. After compounding monthly for five years at interest rates as high as 70%, the debt had swelled to $116,000. Now Mr. Gill is caught up in a second lawsuit with LawBuck$, unable to put the incident behind him (Gorta 2011). While this situation sounds like an extreme example, the loan arrangement is not unique, and is part of a larger trend of third party litigation funding that has been sweeping across America in recent years.

*This is a very preliminary draft. Please do not cite it.

Should third party litigation funding be allowed? If so, are there any regulations that can improve its effects? These two questions address a host of possible issues because third party litigation funding can affect many features of the legal process. In this paper, we restrict our attention to an important sub-question, should contracts between third party litigation funders and plaintiffs be admissible as evidence in court? Before this question can be answered we must distinguish between different types of litigation funding arrangements. As discussed in a recent paper published by the RAND Corporation, there are currently three types of third party litigation financing in the United States. The first involves investments in commercial claims where the funder pays the costs of the litigation in return for a share of the proceeds from the lawsuit; the second is the practice of lending money directly to plaintiffs' law firms; and the third is consumer legal funding, such as the non-recourse loans made by LawBuck$ to Mr. Gills (Garber 2010). Each of these categories of third party litigation financing can have an impact on the civil litigation system in the United States. This paper takes a focused approach in its analysis and will address only consumer legal funding.

Third party litigation funding for individual plaintiffs typically involves loans or advances made to plaintiffs while their case is pending, such as the loans made to Mr. Gill by Lawbuck$. While a claim is pending, plaintiffs often lack financial resources, as the injuries that triggered the lawsuit may have rendered them unable to work and earn money. As a result they can find themselves under tremendous pressure to settle with the defendant to get money now. Other options, such as borrowing money from more traditional lenders or getting money advanced from their attorneys, are generally unavailable (Grous 2006). The money is advanced as a non-recourse loan where the firms charge a high fixed interest rate on the loan, usually between 2% to 5% monthly, to be paid only upon the plaintiff's recovery. It is structured as a loan with the interest rate not dependant on the recovery to avoid champerty and maintenance restrictions, and on a non-recourse basis to avoid usury restriction laws. Even though the size of these loans are usually quite small, since there is still a chance the company will receive nothing if the plaintiff loses, litigation financing companies evaluate each request for funding based on information received about the claim and their determination about the strength of the claim (Grous 2006).

It is this evaluation of the strength of the plaintiff's claim by the litigation funder that forms the basis for our analysis of third party litigation funding. Formally, we develop a model in which the funder uses this evaluation to determine the interest rate to charge a plaintiff that asks for litigation funding. Prior to this evaluation, both the plaintiff and the funder are uninformed about the strength of the plaintiff's case. The plaintiff, however, knows how badly its immediate need for money (its discount factor), but the funder does not. Thus, in making a funding offer to the plaintiff, the funder runs the risk of foregoing a profitable loan if it charges too high an interest rate.[1]

[1] Because the evaluation of the case requires some sunk costs, we assume that the litigation funder has market power and can make a take it or leave it interest rate offer to the plaintiff.

If the plaintiff accepts the loan, we then analyze the effect of admitting the terms of the loan to the court and making it part of the record of the case. We then show that there exists a separating equilibrium in which the terms of the loan reveal the results of the funder's evaluation (its signal) to the court. We show that this has two benefits. First, and fairly obviously, because the funder's evaluation provides some indication about the strength of the plaintiff's case, admitting the funding contract as evidence, and thus revealing that signal, improves the accuracy of the court decision. Second, and more subtly, the demands of a separating equilibrium can, under some conditions, require the funder to reduce the interest rate it charges the plaintiff. This not only increases the payoff of the plaintiffs who receive loans, it also improves efficiency by reducing the funder's ability to profit from its market power. This leads to plaintiffs who otherwise would not accept third party litigation funding due to the high interest rates to accept this funding now at lower rates. Since the plaintiffs discount factor is less than the funders, these loans are welfare-increasing.

Third party litigation funding has been a hotly debated topic in recent years. While the signaling aspect of such funding contracts that we analyze has not yet been discussed, it does raise a host of other issues that have been informally debated. Proponents of third party funding argue that it increases access to justice for plaintiffs, which allows them to avoid settling prematurely. While we do not directly address settlements, our model suggests that making funding contracts admissible would advance this interest because it increases the access to funding contracts to more plaintiffs by reducing the interest rate.

Proponents also argue that third party funding aligns the bargaining power between parties who are frequently involved in lawsuits and parties without the means to pay litigation costs (Rhee 2009). Litigation funding is also seen as desirable because it allows plaintiffs to hedge risks that they are ill suited to bear. Other authors have argued that third party financing can help alleviate agency problems in the attorney–client relationship by aligning the incentives of each party (Schanzenbach and Dana 2009). Increased third party funding may even lead to a reduction in the amount of litigation due to more accurate evaluations of the strength of a claim. This is another claim that our model indirectly suggests could be helped by admissible contracts. Just as introducing a litigation funding contract with a relatively low interest rate can help the plaintiff, if the plaintiff does not introduce such a contract, as might happen if it has a weak claim that a funder would not fund, its chance of winning may decline.

Other authors have argued for abandoning the doctrines that prohibit assignment or maintenance of legal claims by third parties as lacking any basis in corrective justice or public policy (Sebok 2011). Papers have even gone so far as to propose a risk-transfer system that would allow for defendants in lawsuits to share their risk with an investment company by paying the investor the expected value of the lawsuit plus a premium (Molot 2009).

Opponents of third party litigation funding are concerned that because the funder's sole interest in the lawsuit is financial, the funder will only be concerned with maximizing its return on its investment and will not be concerned with the plaintiff's rights. They counter the arguments that third party funding increases a plaintiff's access to justice by saying that "third-party litigation funding increases a plaintiff's access to the courts, not to justice" (Beisner 2009). Funders desiring to protect their investment could undercut a plaintiff's control over the suit. Also, because the funder does not have a fiduciary relationship or privilege with the plaintiff, its involvement in the suit will eventually cause an unwanted relaxation of rules governing attorney-client privilege and attorney professional responsibility. Opponents reason that litigation will be prolonged unnecessarily because third party funders introduce a disincentive for plaintiffs to settle below the funder's suggested amount (Beisner 2009). Lastly, authors have proposed that allowing third party litigation funding will lead to an increase in litigation that will be harmful to the civil litigation system (Rubin 2009).

The rest of the paper is organized as follows. Second two describes the legal and factual background for third party litigation funding. Second three describes a numerical example that illustrates the main results of the model. Second four presents a general model of the signaling aspects of third party litigation funding. Section five concludes.

2 Legal and Factual Background

The litigation funding industry is a new and a growing business in the United States. As litigation financing has grown, a secondary market in legal claims has also been created where funders go public and sell shares of legal-claims backed securities to the public. There are also at least two publically traded companies that invest in legal claims.

Some foreign common law systems have been already shown acceptance of third party litigation funding, although to varying degrees. Australia, for example, has a well-developed system of litigation financiers (Martin 2008). The landmark case on this issue occurred in 2006 in *Campbells Cash and Carry Pty Ltd. v. Fostif Pty Ltd*,[2] where the Austrialian High Court held that third party funding was permitted even when the funder had broad powers to control the litigation. In contrast, in 2005 in *Arkin v Borchard Lines Ltd & Others*,[3] the English Court of Appeals held that third party funding was only acceptable so long as the claimant remained in control of the litigation. While the third party funding industry in Great Britain is not as advanced, it is reported to be developing quickly. South Africa and New Zealand also have decisions accepting the practice. The U.S system is different from those countries in two important respects. First, in the U.S. most of the lawsuits subject to third party funding are paid on a contingency fee basis and not on hourly rates. Second, in the U.S. the winner of the cases bears its own legal costs whereas in other countries they are borne by the losing party.

[2] [2006] HCA 41 (Australia).
[3] [2005] EWCA Civ 655

United States courts have approached third party litigation financing with mixed attitudes. Courts enforcing obstacles against this type of financing typically use doctrines prohibiting champerty and usury. Champerty is a form of maintaining, supporting, or promoting another party's litigation where the money provided for litigation is later exchanged for a portion of the proceeds. Usury, an unrelated doctrine, is when a lender takes more compensation—usually in the form of interest—in exchange for a loan than is legal.

Most jurisdictions have not yet addressed the champerty issue and many traditionally enforce prohibitions against it. However, there is a trend to abolish champerty restrictions or at least avoid applying them to third party litigation financing arrangements where there is no good public policy argument against the agreement and the funder does not take advantage of the borrower.

Champerty restrictions were never adopted in every United States jurisdiction. For example, New Jersey never adopted any limitations.[4] Connecticut never adopted any either, although it does test whether a litigation finance agreement is against public policy.[5] Kansas has only adopted restrictions in the case where parties frequently initiate litigation [6]. Indeed, more states have taken steps towards rejecting restrictions. Massachusetts abolished them in 1997 in Saladini v. Righellis,[7] reasoning that while the purpose of champerty laws is to combat excessive litigation, other doctrines such as public policy against unreasonable contingency fees or the prohibitions against frivolous lawsuits, can do a better job. The court explained that it will look to factors such as the respective bargaining power and awareness of the parties, the borrower's ability to pursue the lawsuit without the funds, and whether the total amount paid to the funder if she is successful would be unreasonable.

The South Carolina Supreme Court similarly decided to abolish champerty restrictions and use other doctrines to battle the evils it meant to target. It used similar factors and noticeably added whether the funder is an "official intermeddler."[8] While both Massachusetts and South Carolina abandoned restrictions, they still look to see if the funder exercises too much control over the litigation. Texas takes this approach as well; Texas courts will determine whether funding agreements are predatory, the extent of control exercised by the funder, and the extent to which similar agreements would burden the judicial system.[9] Florida has reached a similar end by limiting champerty laws to funders that act as officious intermeddlers. In Ohio, the legislature passed a law in 2008 allowing and regulating litigation financing agreements, stating that financing contracts must explicitly state the funder can exercise no control

[4] See *Schomp v. Schenck*, 40 N.J.L. 195, 195 (N.J. Sup.Ct.1878).

[5] *Robertson v. Town of Stonington*, 750 A.2d 460, 463, (Conn. 2000) (citing *Rice v. Farrell*, 28 A.2d 7, 8 (Conn. 1942).

[6] See *Boettcher v. Criscione*, 299 P.2d 806, 811 (1956) (opinion modified on reh'g, 305 P.2d 1055 (1957)).

[7] 687 N.E.2d 1224, 1225-1226 (Mass. 1997). Other doctrines include utilizing public policy against unreasonable fees, sanctions for misconduct, the standards of fair dealing, and the doctrines of unconscionability, duress, and good faith. Id at 1227.

[8] See *Osprey, Inc. v. Cabana Ltd. Partnership*, 532 S.E.2d 269, 277 (S.C. 2000).

[9] See *Bob T. Patterson v. Perry Pritchard* 193 S.W.3d 87, 104 (Tex. App. 2006).

over the litigation or settlement discussions. Maine takes a similar approach.

Despite the trend towards abandoning champerty laws, some states have strongly stood by them. Most notable is Minnesota in *Johnson v Wright*,[10] where the court explicitly supported ongoing enforcement of the doctrine. In sum, as far as champerty is concerned, there is a trend to abolish restrictions, or at least avoid applying them to third party litigation financing arrangements where there is no good public policy argument against the agreement and the funder does not take advantage of the borrower—for instance by controlling the litigation or having the ability to force an early settlement. That being said, most jurisdictions have not yet addressed the issue, and many of those traditionally enforce doctrines against champerty.

The usury doctrine has also been used to a limited extent to challenge third party financing arrangements. It prohibits charging excessive interest in exchange for a loan of money or property. A common element of usury is an absolute obligation to repay. Third party financing such as the consumer legal funding discussed in our model generally are non-recourse loans and therefore do not require repayment to the funding company if the party recovers nothing, so prohibitions against usury are generally avoided.

Many courts classify financing agreements as something other than loans because of their contingent nature and therefore remove them from the realm of usury. A New York trial court found a third party funding agreement to be usurious because repayment was obligatory, but then adjusted the interest rate to make it legal instead of voiding the agreement.[11] North Carolina has broad usury laws, including both loans with unconditional obligations to repay the principle as well as advances. In *Odell v. Legal Bucks, LLC*, the North Carolina court found an agreement to be invalid because although it was contingent, it wa[12]s an advance.

With this legal background, we now proceed to exaamine the effects of allowing litigtion funding and making these contracts admissible in court. We begin with an illustrative example.

3 Example

3.1 Set-up

A plaintiff (P) is suing a defendant (D). If the plaintiff wins, it is entitled to an award of a. The intrinsic strength of the plaintiff's case is given by $s \in \{L, H\}$. This is unknown to all parties. But all parties know that each is equally likely ex ante. The court will rule for P if and only if its posterior probability that $s = H$ is strictly greater than 1/2. At trial, the court will get a costless signal of s, $\sigma_c \in \{l, m, h\}$. The plaintiff can also take the case to a third party litigation

[10] 682 N.W.2d 671, 674 (Minn. Ct. App. 2004).

[11] *Echeverria v. Estate of Lindner*, 7 Misc. 3d 1019(A), 801 N.Y.S.2d 233 (N.Y. Sup. Ct. 2005) judgment entered sub nom. *Echeverria v. Lindner*, 018666/02, 2005 WL 6050781 (N.Y. Sup. Ct. Mar. 18, 2005).

[12] 665 S.E.2d 767, 776 (N.C. Ct. App. 2008).

funder (LF). LF can also receive a costless signal of s, $\sigma_{lf} \in \{l, m, h\}$. Based on this signal, LF will offer P a non-recourse loan of L at a gross interest rate of r where the payoff from the lawsuit is LF's only collateral. That is, if P wins, it pays LF $\min\{a, rL\}$, (that is, if R is the conventional interest rate, we define $r = 1 + R$). If P loses, then it pays nothing to LF. P can accept or reject this contract. We denote such an offer as $\{L, r\}$.

While P's case strength is initially unknown to all, P does have private information about its need for immediate money (say to pay medical expenses or cover living expenses if it can no longer work). That is, we assume that with probability 1/2 P has no immediate need for money, with probability 1/2 P has a discount factor of $\beta < 1$. (That is, with probability 1/2, $P's$ need is such that every dollar it recevies at trial is worth only fraction β of a dollar that it receives immediately from LF.) LF does not discount the future.

We consider what can happen when P can choose to introduce its contract with LF as evidence in court. That is, we will examine a separating equilibrium in which the contract reveals the signal that LF recevied. We assume that LF can show its signal to P prior to making P a contract offer. Thus, LF and P contract with symmetric information about the strength of P's case (P has private information about her discount factor). We will demonstrate that allowing the contract to be evidence is beneficial not only because it improves the accuracy of the outcome (a trivial result given that the signal provides additional information and the court is a rational Bayesian updater), but also because it reduces the ability of the monopoly litigation funder to exploit its monopoly power. The reason, as we discuss below, is that when LF receives a high signal, it will (under some conditions) have to offer a more favorable interest rate than it would otherwise want to in order to convince the court that it really did receive a high signal.

Both LF and the court have access to the same signaling technology, but they receive independent signals from this distribution. Let g_{is} be the probability of a signal i given a case strength of s. In this example we will consider two different possible signaling technologies. The more accurate technology has $\{g_{hH} = 3/4, g_{mH} = 1/4, g_{lH} = 0, g_{hL} = 0, g_{mL} = 1/4, g_{lL} = 3/4\}$. The less accurate technology has $\{g_{hH} = 1/2, g_{mH} = 3/8, g_{lH} = 1/8, g_{hL} = 1/8, g_{mL} = 3/8, g_{lL} = 1/2\}$.

3.2 Court behavior

First, we show that the court will rule for P if the court's own signal from trial and any signal it indirectly infers from the contract between P and LF contain at least one high signal and no low signal. Thus, if P has a contract with LF that reveals a high signal to the court, it can win if the court directly receives a medium or high signal. If P does not reveal a contract with LF or the contract reveals a medium signal, then the court will rule for P only if it obtains a high signal. *(*Given that P is indifferent about revealing its contract when its contract reveals $\sigma_{lf} = m$, we assume P does reveal it.*)* If P's contract reveals a low signal, then P cannot win at trial (in this case, P would never reveal its contract).[13]

To see all this consider first the case where the court does not observe a contract between LF and P. This will happen with probability one if $\sigma_{lf} = l$. We show below that P rejects a contract from LF if this contract accurately reveals $\sigma_{lf} = m$ if and only if P does not discount the future (which occurs with probability 1/2). Thus, since the prior probabilities are equally likely, the court's posterior probability that $s = H$ after receiving a high and not observing a contract with LF is:

$$\frac{g_{hH}(g_{mH}/2 + g_{lH})}{g_{hH}(g_{mH}/2 + g_{lH}) + g_{hL}(g_{mL}/2 + g_{lL})}$$

This is equal to 1 with the more accurate signaling technology and equal to $20/31 > 1/2$ with the less accurate technology. Given that the court will rule for P if it observes no contract, it will also rule for P if it observes a contract that reveals a medium or high signal and obtains a high signal itself.

Next consider the court's posterior if it observes two medium signals. Its posterior probability that $s = H$ *is:*

$$\frac{g_{mH}g_{mH}}{g_{mH}g_{mH} + g_{mL}g_{mL}}$$

This is exactly 1/2 under both signaling technologies, so the court will rule against P.

Lastly, if the court obtains a low and high signal, its posterior probability that $s = H$ is:

$$\frac{g_{hH}g_{lH}}{g_{hH}g_{lH} + g_{hL}g_{lL}}$$

This isn't possible under the more accurate technology (since a high signal cannot come from a low type and a low signal cannot come from a high type). Under the less accurate technology this probability is also exactly 1/2, so the court rules against P.

We have now verified that with both signaling technologies, the court will rule for P if the signals it receives and infers from the litigation funding contract are either $\{h, h\}, \{h, m\}, \{m, h\}$, or $\{\varnothing, h\}$ and otherwise it will rule for D.

3.3 P's probability of prevailing after dealing with LF

Now we derive P's probability of prevailing after it has seen LF's signal and either has a contract with LF or does not. There are several cases we need to consider. For all of these cases, recall that the prior probability of high and low case strength is 1/2, so prior probabilities do not enter the formulas. Let

[13] We assume that P's litigation costs are low enough that it doesn't drop the case if it receives a low signal–it prefers just to not reveal its contract so that it can win if the court obtains a high signal. We could allow for P to drop the case if it recevies a low signal from LF. This would make the court view the absence of a contract between LF and P more favorably.

p_h be P's probability of prevailing given that LF recevied a high signal and the court knows this.

$$p_h = \frac{g_{hH}(g_{hH} + g_{mH})}{g_{hH} + g_{hL}} + \frac{g_{hL}(g_{hL} + g_{mL})}{g_{hH} + g_{hL}}$$

The first term is the probability that $s = H$ given that LF received a high signal times the probability that the court will receive either a high or medium signal given that $s = H$. The second term is the probability that $s = L$ given that LF received a high signal times the probability that the court will receive either a high or medium signal given that $s = L$.

Let $\hat{p}_h$ be P's probability of prevailing given that LF recevied a high signal, but the court does not observe this contract.

$$\hat{p}_h = \frac{g_{hH}^2}{g_{hH} + g_{hL}} + \frac{g_{hL}^2}{g_{hH} + g_{hL}}$$

$\hat{p}_h < p_h$ because now P can only win if the court receives a high signal.

Let p_m be P's probability of prevailing given that LF recevied a medium signal and the court knows this (or does not observe a contract at all).[14]

$$p_m = \frac{g_{mH} g_{hH}}{g_{mH} + g_{mL}} + \frac{g_{mL} g_{hL}}{g_{mH} + g_{mL}}$$

Let $\hat{p}_m$ be P's probability of prevailing given that LF recevied a medium signal, but the court is fooled by the contract into thinking that LF received a high signal (so it rules for P if it receives either a medium or high signal).

$$\hat{p}_m = \frac{g_{mH}(g_{hH} + g_{mH})}{g_{mH} + g_{mL}} + \frac{g_{mL}(g_{hL} + g_{mL})}{g_{mH} + g_{mL}}$$

$\hat{p}_m > p_m$ because now P can win if the court receives a high or medium signal rather than only with a high signal.

For the more accurate signal technology, these expressions are $\{p_h = 1, \hat{p}_h = 3/4, p_m = 3/8, \hat{p}_m = 5/8\}$. For the less accurate technology, they are $\{p_h = 4/5, \hat{p}_h = 17/40, p_m = 5/16, \hat{p}_m = 11/16\}$.

3.4 Contract between LF and P

Now that we have established the court's strategy (pending our proof of the claim that P rejects a contract with LF that accurately reveals a medium signal if and only if P does not discount the future), we can focus on the offer that LF will make based on its signal and on P's acceptance or rejection of that offer. We assume LF is a monopolist and can make a take it or leave it offer to P. As discussed above, it is reasonable to focus on the case in which LF has

[14] These are identical since in the absence of a signal the court rules for P only if it receives a high signal, just as it does if the court observes a medium signal from LF.

market power given that only some market power would justify LF expending resources to obtain an accurate signal.[15]

If LF obtains a low signal, then P will never reveal this signal, so the signaling function will not operate in this case. Furthermore, P's probability of prevailing will not increase if it has a contract with LF that convinces the court that LF received a medium signal. So, the low signal case is not of interest, and we will not discuss it further.

If LF recevies a medium signal and offers a contract that reveals this, this contract does not increase P's chances of prevailing at trial. Hence, the only profitable contract that LF can offer will be accepted only if P discounts the future. In that case, the optimal contract will have the maximum repayment since P has a higher value on current money than does LF. Thus, $L = a/r$. Given this, P's payoff from accepting the contract is a/r (the probability of winning no longer matters since the entire proceeds get paid to LF if P wins). P's payoff from rejecting the contract is $p_m a\beta$ since p_m is the probability that P prevails if LF obtained a medium signal and the court will rule for P if its signal is high, and $a\beta$ is the value to the P that discounts the future of winning an award a at trial. Thus, the highest interest rate P will accept is $r = 1/(p_m\beta)$. Since the probability that P will accept this contract is $1/2$, LF's expected profit from offering this contract is $(p_m a - L)/2 = (1-\beta)p_m a/2$.

Alternatively, consider what happens if LF offers a contract with an interest rate that convinces the court that it received a high signal (even though, it received a medium signal). To fool the court, this contract must have the same interest rate, r_h, that LF would offer if it actually received the high signal. If this contract is accepted by P with probability one (i.e., even if P does not discount the future),[16] then LF's profit from such a contract is $(\hat{p}_m r_h - 1)L$. As we show below in the general model, when LF receives a high signal it will want to lend the maximum amount. The maximum is determined by the repayment constrainted $rL = a$. So, we can write this profit as $(\hat{p}_m - 1/r_h)a$.

Not surprisingly, this is increasing in r_h, the interest rate. Thus, to generate a revealing equilibrium, r_h must be small enough that the profit from offering this deceiving contract is less than the profit from offering a truthfully revealing one:

$$(\hat{p}_m - 1/r_h)a \leq (1-\beta)p_m a/2$$

So, the maximum interest rate that LF can offer when it receives the high signal in order to accurately reveal this (by preventing mimmicking when LF receives a medium signal) is given by $r_h = 2/(2\hat{p}_m + (1-\beta)p_m)$. For the more accurate signal technology, this becomes $r_h = 16/(7+3\beta)$. For the less accurate technology, this is $r_h = 32/(17+5\beta)$.

Now consider what contract LF would offer when it receives the high signal if it did not have to worry about making an offer that would convince the court

[15] While we do not consider the costs of acquiring a signal in the model, clearly it will be costly, which will prevent perfect competition among litigation funders.

[16] It is also possible that the interest rate is high enough that P only accepts if she discounts the future. For the two signaling technologies used in this example, this does not occur, so we will not discuss it in the example. We do deal with this case in the general model.

it really received a high signal. If LF wants to make an offer that P will accept with probability one (whether she discounts the future or not), then (with $L = a/r$) LF must set $r \leq 1/\hat{p}_h$. To see that, notice that P's expected payoff, if she doesn't discount the future, from rejecting this contract is $\hat{p}_h a$. Her payoff from accepting it is $L = a/r = a\hat{p}_h$ at the maximum r. LF's profit from offering this contract is $a(p_h - \hat{p}_h)$.

Alternatively, LF could offer a contract that P will only accept if she discounts the future. The most profitable contract that LF can offer to a plaintiff that discounts the future is $L = a\beta\hat{p}_h$ and $r = 1/\beta\hat{p}_h$. Since this contract is only accepted with probability 1/2, LF's profit from offering this contract is $a(p_h - \beta\hat{p}_h)/2$. This is more profitable than offering the contract that P accepts with probability one if and only if $\beta < 2 - p_h/\hat{p}_h$.

If $\beta \geq 2 - p_h/\hat{p}_h$ (which corresponds to $\beta \geq 2/3$ under the more accurate signal technology and $\beta \geq 2/17$ under the less accurate technology), then no-mimicking interest rate maximum is not binding on LF under the more accurate signal technology. That is, $1/\hat{p}_h = 4/3 < 16/(7 + 3\beta)$. So, in this case LF's need to convincingly reveal its high signal through its contract with P does not affect the interest rate that P pays. Under the less accurate technology, however, the no-mimicking interest rate maximium is binding. That is, $1/\hat{p}_h = 40/17 > 32/(17+5\beta)$. As a result, P does pay a substantially lower interest rate because because LF needs to convincingly reveal its signal through its contract.

If $\beta < 2 - p_h/\hat{p}_h$, then the no-mimicking interest rate maximum is binding under either signal technology. LF would like to charge an interest rate of $1/\beta\hat{p}_h$. Under the more accurate signal technology, this is $4/3\beta > 16/(7 + 3\beta)$ for $\beta < 2/3$. At $\beta = 2/3$, the constraint reduces P's interest rate from $r = 2$ to $r = 16/9$. At $\beta = 1/3$, the reduction is much greater, from $r = 4$ to $r = 2$; P obtains twice as much money for the same repayment requirement. Under the less accurate signal technology, LF's unconstrained interest rate is $r = 40/17\beta > 32/(17 + 5\beta)$. For $\beta = 1/2$, this means r drops from almost 5 to under 2 because of the no-mimicking constraint.

These interest rate comparisons reflect the effect of requiring LF to reveal its signal through its contract rather than to directly reveal its signal to the court. As such, they represent the effect of a legal rule allowing the introduction of the litigation funding contract into evidence but not the specific evidence uncovered by the litigation funder. Of course, such a legal rule is probably unnecessary since LF's signal is likely to be due more to its expertise in evaluating the available evidence and such an evaluation is soft information whose direct revevlation in court is likely not to be credible. Once LF has an interest in the case, its testimony that LF has a strong case would be discounted as entirely biased.

One might also wonder how the interest rate is affected relative to the case in which neither the contract nor the direct evidence uncovered by LF are admissible. In this case, LF's signal does not affect the outcome of the case, it only provides LF to better predict the outcome. Thus, LF cannot profitably contract with P unless P discounts the future. Thus, if LF receives a high signal, it will always offer the contract $L = a\beta\hat{p}_h$ and $r = 1/\beta\hat{p}_h$. From the analysis above, we can see that for any β under either signal technology that allowing the introduction of the contract between LF and P as evidence will reduce the interest rate that P pays.

In this simple example, the interest rate reduction when LF receives a high signal has no direct welfare effect because there is only one type of P that discounts the future. Thus, if P discounts the future she always receives a loan. That said, there is still an indirect effect through increased accuracy. Notice that if $\beta < 2 - p_h/\hat{p}_h$, then if LF were unconstrained it would offer a loan contract that P only accepts if it discounts the future. This means that if P does not discount the future, the court does not get the benefit of LF's signal, making its decision less accurate. Under the no-mimicking constraint, however, LF must offer a lower interest rate, inducing P to accept even if she does not discount the future. Thus, the court does get the benefit of LF's informative signal. This increase in accuracy could increase social welfare.

More generally, the reduction in the interest rate when the no-mimicking constraint is binding can directly inicrease social welfare. If there are many types of P that discount the future, then a higher interest rate may cause a P that discounts the future some but not as much as other types to forego a contract with LF. Since it is efficient for LF to loan money to any P type that discounts the future, this represents a social welfare loss. A no-mimicking constraint that reduces the interest rate reduces the dead-weight loss from LF's monopoly power. We see this effect in the general model below.

4 Model

A plaintiff (P) is suing a defendant (D). If the plaintiff wins, it is entitled to an award of a. The intrinsic strength of the plaintiff's case is given by $s \in [0, 1]$. This is unknown to all parties. But all parties know it is distributed according to the distribution function $F(s)$, with associated density f. The court will get a signal of the s, $\sigma_c \in \{l, m, h\}$. The plaintiff can also take the case to a third party litigation funder (LF). LF can also receive a signal of s, $\sigma_{lf} \in \{l, m, h\}$. Based on this signal, LF will offer P a non-recourse loan of L at a gross interest rate of r where the payoff from the lawsuit is LF's only collateral. That is, if P wins, it pays LF $\min\{a, rL\}$, (that is, if R is the conventional interest rate, we define $r = 1 + R$). If P loses, then it pays nothing to LF. P can accept or reject this contract. We denote such an offer as $\{L, r\}$.

Notice that we are assuming that LF makes a take it or leave it offer to P and is not subject to competition. While this is an extreme assumption, it is natural to think that LF must have some market power given that obtaining a signal as to the strength of P's case is likely to be costly. If there were perfect competition, LF could never recoup this investment. The effects that we identify here, that the need to create a revealing equilibrium constrain LF's ability to exercise its market power, will be qualitatively similar as long as LF does have some market power.

The court will rule for the plaintiff if its posterior probability that $s \geq \bar{s}$

is larger than 1/2. That is, if the court cannot observe any contract between LF and P, it rules for P if and only if $\Pr[s \geq \bar{s} \mid \sigma_c] > 1/2$. If the court can observe the contract, K, between F and P, then it rules for P if and only if $\Pr[s \geq \bar{s} \mid \sigma_c, K] > 1/2$. We allow for the possibility that $K = \varnothing$, that is, the court does not observe (and makes inferences there from) a contract between LF and P.

Let $g_\sigma(s)$ be the probability that $\sigma_j = i$ given s for $j \in \{c, lf\}$ and $\sigma \in \{l, m, h\}$. That is, the court's and funder's signals have the same likelihood function. Then we can write $\Pr[s \geq \bar{s} \mid \sigma_c] = \frac{\int_{\bar{s}}^1 f(s) g_{\sigma_c}(s) ds}{\int_0^1 f(s) g_{\sigma_c}(s) ds}$. We will assume that g_σ satisfies the monotone likelihood ratio property. That is, we assume $\frac{g_m(s)}{g_l(s)}$ and $\frac{g_h(s)}{g_m(s)}$ are both non-decreasing in s. This guarantees that $\Pr[s \geq \bar{s} \mid h] \geq \Pr[s \geq \bar{s} \mid m] \geq \Pr[s \geq \bar{s} \mid l]$.

We will start by assuming that if the court does not observe any contract between LF and P, then it rules for P if and only if $\sigma_c = h$. If the court can observe a contract between LF and P, then it will rule for P if and only if the two signals are $\{h, h\}, \{h, m\}$ or $\{m, h\}$. We establish in the appendix the conditions under which this behavior satisfies our assumption that the court's posterior probability that $s \geq \bar{s}$ is larger than 1/2. The assumption of when the court rules for the plaintiff is without significant loss of generality. It is important that getting a favorable signal from LF makes it easier for P to win. As long as we assume that, the qualitative results will be similar even if we were to have different signal cutoffs. The exposition is simpler when we make these cutoffs concrete.

For simplicity, we assume that LF does not discount the future. To capture the fact that some litigation funding is driven by the plaintiff's need for immediate funds, we assume that with probability q, P also does not discount the future, but with probability $1 - q$, she does. Given that she does discount the future, we assume her discount factor β is uniformly distributed between $[\underline{\beta}, 1]$ where $\underline{\beta} \geq 0$.

Given that LF will offer a lower interest rate the more likely that it thinks P will win. The interest rate has the potential to reveal LF's signal to the court. We will look for an equilibrium in which there are interest rate cutoffs r_h and r_m such that the court infers that $\sigma_{lf} = h$ if and only if $r \leq r_h$, $\sigma_{lf} = m$ if and only if $r_h < r \leq r_m$ and $\sigma_{lf} = l$ if and only if $r > r_m$. Let p_h be P's probability of winning given that it accepts a contract with $r \leq r_h$. That is, p_h is simply $\Pr[\sigma_c \in \{m, h\} \mid \sigma_{lf} = h] = \frac{\int_0^1 f(s) g_h(s)(g_h(s) + g_m(s)) ds}{\int_0^1 f(s) g_h(s) ds}$. Let $\hat{p}_h$ be P's probability of winning given that it rejects a contract with $r \leq r_h$. That is, $\hat{p}_h$ is simply $\Pr[\sigma_c = h \mid \sigma_{lf} = h\} = \frac{\int_0^1 f(s) g_h(s) g_h(s) ds}{\int_0^1 f(s) g_h(s) ds}$. Clearly, $p_h > \hat{p}_h$. We focus on the interesting case in which $r_h \geq 1/p_h$ so that LF can profitably offer some contract that reveals it has a high signal.

We can also define analogous probabilities when the funder's signal is medium. Let $p_m = \Pr[\sigma_c = h \mid \sigma_{lf} = m] = \frac{\int_0^1 f(s) g_m(s) g_h(s) ds}{\int_0^1 f(s) g_m(s) ds}$. Then, p_m is the probability that P prevails if either it accepts a contract with $r_h < r \leq r_m$ or it rejects a contract (remember, we are assuming that the court will rule for the plaintiff if it gets a high signal and does not observe a contract). If, however, P accepts a contract with $r \leq r_h$, then the court will believe that $\sigma_{lf} = h$. In that case, P's probability of prevailing will be $\Pr[\sigma_c \in \{m, h\} \mid \sigma_{lf} = m] = \hat{p}_m = \frac{\int_0^1 f(s)g_m(s)(g_h(s)+g_m(s))ds}{\int_0^1 f(s)g_m(s)ds} > p_m$.

In a fully revealing equilibrium, if the contract reveals a low signal, then P cannot win at trial. Hence, P will only accept a contract that would reveal a low signal if she can choose to hide this contract from the court. If so, then P will only accept such a contract if she discounts the future. Such a contract is simply a surplus increasing loan from a more patient to a less patient party. If the contract reveals a medium signal, then it does not affect P's probability of prevailing at trial (again, this is under our assumption about the court's decision rule). So, once again, P will only accept the contract if she discounts the future. If LF receives a high signal and the contract reveals this, howver, then such a contract increases the joint surplus between P and LF even if P does not discount the future. This is because the contract sends a signal that increases P's probability of prevailing at trail. Of course, if P does discount the future, she will accept such a contract with a higher interest rate than she would if she did not discount the future. So, it still could be optimal for LF to offer a contract that P only accepts if it discounts the future sufficiently.

4.1 Funder's optimal contract with a high signal

In this subsection, we examine the unconstrained optimal contract between LF and P when LF receives a high signal. By unconstrained, we mean that we assume that the court will correctly infer from this contract that LF's signal was high. We re-evaluate this assumption in the next subsection when we analyze the optimal contract when LF receives a medium signal by determining if LF wants to offer the unconstrained optimal high signal contract to fool the court into thinking it received a high signal.

The first step in our analysis is to determine P's response to an offer from LF. The following lemma describes how P will respond to a contract offer from LF when LF receives a high signal and the court interprets the contract as indicating that LF received a high signal.

Lemma 1 *If $r \leq r_h$, then P accepts an offer of $\{L, r\}$ with probability one if and only if $r \leq \frac{1}{p_h} + \frac{a(p_h - \hat{p}_h)}{p_h L}$. For $r > \frac{1}{p_h} + \frac{a(p_h - \hat{p}_h)}{p_h L}$, the probability that P accepts $\{L, r\}$ is $\frac{(1-q)L}{p_h r L - a(p_h - \hat{p}_h)}$.*

Proof. If $r \leq r_h$ (so that the court will infer $\sigma_{lf} = h$), P will accept an offer of $\{L, r\}$ even if it does not discount the future if and only if $p_h(a - r * L) + L \geq \hat{p}_h a$. The left hand side is P's expected payoff from accepting the contract; she receives an immediate payment of L. If she wins (which happens with probability p_h if she accepts the contract that signals $\sigma_{lf} = h$ to the court), then she receives an award of a but has to pay back an amount rL. The right hand side is P's expected payoff from rejecting the contract. This reduces her probability of winning to $\hat{p}_h$, and if she wins she again receives an award of a. Thus, if LF receives a signal of h and $r \leq r_h$ (so that the court will infer that LF received a signal of h), then P's payoff from accepting the offer (if she does not discount the future) is at least as great as her payoff from rejecting it if and only if $r \leq \frac{1}{p_h} + \frac{a(p_h - \hat{p}_h)}{p_h L}$. If P accepts if she does not discount the future, then she will accept if she does discount the future as well.

For larger r (provided $r \leq r_h$), then P will only accept if she discounts the future sufficiently. If she has discount factor β, then her payoff from accepting the contract is $p_h(a - r * L)\beta + L$. Her payoff from rejecting it is $\hat{p}_h a\beta$. Setting these equal to each other and solving for β gives the cutoff discount factor for which all lower discount factors accept the contract. Since $\beta < 1$, we multiply this by $1 - q$ to account for the mass point at a discount factor of one. Thus, probability that P will accept a contract with an interest rate of r is $\frac{(1-q)L}{p_h r L - a(p_h - \hat{p}_h)}$. Q.E.D. ■

If LF gets a high signal, then its expected profit from offering a contract $\{L, r\}$ if $r \leq r_h$ is:

$$\frac{(1-q)L}{p_h r L - a(p_h - \hat{p}_h)}(p_h r - 1)L \text{ if } r > \frac{1}{p_h} + \frac{a(p_h - \hat{p}_h)}{p_h L} \tag{1}$$

$$(p_h r - 1)L \text{ if } r \leq \frac{1}{p_h} + \frac{a(p_h - \hat{p}_h)}{p_h L}$$

So if $\frac{1}{p_h} + \frac{a(p_h - \hat{p}_h)}{p_h L} \geq r_h$, then $\{a/r_h, r_h\}$ maximizes LF's profit given $r \leq r_h$. To see this, note that any contract that satisfies $r \leq r_h$ will be accepted with probability one, in which case the profit is increasing in both r and L (since $r_h \geq 1/p_h$). $L = a/r_h$ is the maximum loan size since LF cannot recover more than a.

If $\frac{1}{p_h} + \frac{a(p_h - \hat{p}_h)}{p_h L} < r_h$, then LF has no reason to ever choose $r < \frac{1}{p_h} + \frac{a(p_h - \hat{p}_h)}{p_h L}$. If it chooses $r = \frac{1}{p_h} + \frac{a(p_h - \hat{p}_h)}{p_h L}$ and obtains a contract with probability one, its profit is $a(p_h - \hat{p}_h)$; LF obtains the surplus from increasing P's probability of winning. Notice that in this case, LF is indifferent to L, the size of the loan. If P has a discount factor less than one, however, then P prefers a larger L. Also, the larger the L the lower the interest rate, making it easier to satisfy $r \leq r_h$. Thus, we will assume that in this case the loan is the maximum that P can fully repay if it wins. That is, $L = a\hat{p}_h$ and $r = 1/\hat{p}_h$.

Alternatively, LF can choose a higher interest rate and make a loan only if P discounts the future. In this case, it chooses $\{L, r\}$ to maximize $\frac{(1-q)L}{p_h r L - a(p_h - \hat{p}_h)}(p_h r - 1)L$. To simplify the analysis, we define $\rho = rL$, and the profit function becomes $\frac{(1-q)(p_h r - 1)\rho^2}{(p_h \rho - a(p_h - \hat{p}_h))r^2}$. This is convex in ρ since $p_h \rho - a(p_h - \hat{p}_h) > 0$ so that the probability of acceptance is positive. Thus, the maximum profit happens at the extremes of ρ. One extreme was analyzed above, when ρ was small enough so that the probability of acceptance was one. Now, we consider the other extreme, $\rho = a$. This makes the profit function $\frac{(1-q)(p_h r - 1)a}{\hat{p}_h r^2}$, whose maximum is at $r = 2/p_h$. Since this outcome requires a higher interest rate than the prior one, this outcome can only occur if $p_h < 2\hat{p}_h$. When feasible, the profit here is $\frac{(1-q)ap_h^2}{4\hat{p}_h}$. Thus, we have proved the following result.

Lemma 2 *If LF receives a high signal, then if the following contracts will convince the court that LF did receive a high signal, the optimal contracts are as follows. If* $p_h < 2\hat{p}_h$*, LF will offer* $\{ap_h/2, 2/p_h\}$ *if and only if* $q < (2\hat{p}_h - p_h)^2/{p_h}^2$*. In this case, LF earns profit of* $\frac{(1-q)ap_h^2}{4\hat{p}_h}$*. Otherwise, LF offers* $\{a\hat{p}_h, 1/\hat{p}_h\}$ *and earns a profit of* $a(p_h - \hat{p}_h)$*.*

4.2 Funder observes a medium signal

All this assumes that $r \leq r_h$. We now investigate what r_h must be so that if LF observes a medium signal it does not want to offer a contract with $r = r_h$. Consider LF's profit if it offers a contract $\{L, r\}$ that reveals $\sigma_{lf} = m$. P's payoff from accepting such a contract is $p_m(a - rL)\beta + L$. Her payoff from rejecting it is $p_m a\beta$. P will accept if and only if $\beta \leq \frac{1}{p_m r}$. So, the probability that the plaintiff will accept the contract is $\frac{(1-q)}{p_m r}$. To sell the contract with probability one, LF would need to set $r = 1/p_m$ which would earn it zero profits. So, its expected profit is $\frac{(1-q)}{p_m r}(p_m r - 1)L$. This is clearly increasing in L. Hence, $L = a/r$. LF maximizes $\frac{(1-q)}{p_m r^2}(p_m r - 1)a$, which implies that $r = 2/p_m$. Thus, LF's expected profit is $(1-q)ap_m/4$.

Instead, imagine that LF offers $\{L, r_h\}$ so as to increase P's probability of winning to $\hat{p}_m$. P's payoff from accepting such a contract is $\hat{p}_m(a - r_h L)\beta + L$. Her payoff from rejecting it remains $p_m a\beta$. Hence, the probability that the plaintiff will accept the contract is $\frac{(1-q)L}{\hat{p}_m r_h L - a(\hat{p}_m - p_m)}$ and LF's profit function is $\frac{(1-q)L}{\hat{p}_m r_h L - a(\hat{p}_m - p_m)}(\hat{p}_m r_h - 1)L$. Notice, this is exactly the same as the profit function when LF received a high signal except that $\hat{p}_m$ replacles p_h and p_m replaces $\hat{p}_h$.

To determine if LF and P have an incentive to agree on a contract that mimmicks a high-signal contract, we start by assuming that the no-mimmick constraint is not binding in order to determine when it will bind because there is an incentive to mimmick the high-signal contract. Notice from the prior analysis that if LF really observes a high signal, the court should never expect to see a contract other than $\{ap_h/2, 2/p_h\}$ or $\{a\hat{p}_h, 1/\hat{p}_h\}$ when the no-mimmicking constraint is not binding. Thus, $r_h \in \{2/p_h, 1/\hat{p}_h\}$ if the no-mimmicking constraint is not binding. We can then determine when the constraint does bind by seeing under what conditions LF wants to offer a high-signal contract when it receives a medium signal. The following propositon provides the result.

Lemma 3 *(A) For* $2\hat{p}_h \leq p_h$ *or* $q > (2\hat{p}_h - p_h)^2/{p_h}^2$*, LF will offer* $\{a\hat{p}_h, 1/\hat{p}_h\}$ *when it receives a medium signal if the court will infer from this contract that LF received a high signal if and only if* $\hat{p}_m - \hat{p}_h > (1-q)p_m/4$*. (B) For* $q < (2\hat{p}_h - p_h)^2/{p_h}^2$ *and* $p_h < 2\hat{p}_h$*, LF will offer* $\{ap_h/2, 2/p_h\}$ *when it receives a medium signal if the court will infer from this contract that LF received a* *high signal if and only if (i)* $(2\hat{p}_m - p_h) > (1-q)p_m/2$ *if* $p_h/2 \geq p_m$ *or (ii)* $p_h(2\hat{p}_m - p_h) > p_m^2$ *if* $p_h/2 < p_m$.

Proof. (A) If LF observes a medium signal, it will never want to charge a lower interest rate than r_h. In (A), we have $r_h = 1/\hat{p}_h$. P's payoff from accepting $\{a\hat{p}_h, 1/\hat{p}_h\}$ is $a\hat{p}_h$. To see this notice that under this contract she has no stake in the outcome of the case, so her payoff is just the loan she receives from LF. Her payoff from rejecting the contract is $p_m a\beta$ because her probability of winning is p_m and she discounts her payoff by β.[17] P will accept this offer even if $\beta = 1$ since $\hat{p}_h > p_m$. Hence, LF's profit will be $(\hat{p}_m - \hat{p}_h)a$.

If, instead, when LF receives a medium signal it makes the optimal offer given that the court will infer a medium signal, then we have seen above that LF's profit will be $(1-q)ap_m/4$. Thus, LF prefers to mimmick the high signal offer of $\{a\hat{p}_h, 1/\hat{p}_h\}$ if and only if $\hat{p}_m - \hat{p}_h > (1-q)p_m/4$.

(B) Now consider $q < (2\hat{p}_h - p_h)^2/{p_h}^2$ and $p_h < 2\hat{p}_h$, so that if LF observes a high signal it would offer $\{ap_h/2, 2/p_h\}$ if the court will believe this indicates a high signal. If LF observes a medium signal (and we assume it can convey this to P), then P's payoff from accepting $\{ap_h/2, 2/p_h\}$ versus rejecting it is $ap_h/2 - p_m a\beta$. Thus, if $p_h/2 \geq p_m$, then all types of P accept. Otherwise, the probability that P accepts is $(1-q)p_h/2p_m$. If P accepts with probability one, then LF's profit from offering this contract is $(2\hat{p}_m - p_h)a/2$. That is,if $p_h/2 \geq p_m$, then LF offers $\{ap_h/2, 2/p_h\}$ when it receives a medium signal if it conveys a high signal to the court if and only if $(2\hat{p}_m - p_h) > (1-q)p_m/2$. Otherwise, LF's profit from offering this contract is $(1-q)p_h(2\hat{p}_m - p_h)a/4p_m$. So, if $p_h/2 < p_m$, LF offers $\{ap_h/2, 2/p_h\}$ when it receives a medium signal if it conveys a high signal to the court if and only if $p_h(2\hat{p}_m - p_h) > p_m^2$. Q.E.D. ■

Proposition 1 provides the conditions under which LF will have to reduce its interest rate below the profit-maximizing level when it actually receives a high signal in order to credibly convey this to the court (so as to avoid an LF with a medium signal wanting to mimic this behavior). That is, when the conditions in the Proposition hold, LF must offer a more favorable contract to P than it would if it did not need to signal its information about the strength of P's case through its contract. Furthermore, in case (B) this means that the probability that P accepts the contract increases. To see this, notice that in case (B), P would not accept the unconstrained optimal contract with probability one when LF received a high signal. From Lemma (1), we know that the cutoff discount factor for acceptance is $\beta = \frac{L}{p_h rL - a(p_h - \hat{p}_h)}$. Evaluating this at the optimal unconstrained contract in this case, $\{ap_h/2, 2/p_h\}$, yields $\beta = \frac{p_h}{2\hat{p}_h}$. Thus, if $\beta > \frac{p_h}{2\hat{p}_h}$, P would not accept the unconstrained contract even though doing so would be jointly optimal. As we will see below, the need to signal will reduce the interest rate in this case and lead to efficient contracts being accepted with a higher probability.

[17] We are assuming that LF can convey the signal to P. In this case, it doesn't matter since P accepts this offer with probability one even if she believes LF observed the high signal.

4.3 Maximum interest rate with high signal

Now we investigate how the contract LF offers when there is a high signal has to change if the constraint that an LF with a medium signal does not want to offer the same contract binds. First, consider case (A) in the above lemma ($2\hat{p}_h \le p_h$ or $q \ge (2\hat{p}_h - p_h)^2/{p_h}^2$). Notice that when LF has a high signal, if it reduces the incentive of a medium signal LF to mimic its contract by either reducing L or reducing r then it will reduce its profit when it has a high signal by even more. However, if it keeps $rL = a$, reduces r and increases L then it only reduces its profit when it has a high signal by the same amount that it reduces the profit of the LF with a medium signal from mimicking it. In both cases, the profit falls by exactly the increase in L since LF's return when P wins stays at a, but it has to pay more up front to obtain this return from the increase in L. The following proposition describes how the contract LF offers P must change when the no-mimicking constraint is binding.

Proposition 4 *(A) For $2\hat{p}_h \le p_h$ or $q > (2\hat{p}_h - p_h)^2/{p_h}^2$, if $\hat{p}_m - \hat{p}_h > (1-q)p_m/4$, then if LF receives a high signal it will offer $\{a\hat{p}_m-(1-q)ap_m/4, 4/(4\hat{p}_m-(1-q)p_m)\}$ instead of $\{a\hat{p}_h, 1/\hat{p}_h\}$ (which it would offer if $\hat{p}_m-\hat{p}_h \le (1-q)p_m/4$).*

(B) (i) For $q < (2\hat{p}_h - p_h)^2/{p_h}^2$ and $2p_m \le p_h < 2\hat{p}_h$, if $(2\hat{p}_m - p_h) > (1-q)p_m/2$, then LF will offer $\{a\hat{p}_m - (1-q)ap_m/4, 4/(4\hat{p}_m - (1-q)p_m)\}$ instead of $\{ap_h/2, 2/p_h\}$ (which it would offer if $(2\hat{p}_m - p_h) \le (1-q)p_m/2$).

(B) (ii) For $q < (2\hat{p}_h - p_h)^2/{p_h}^2$, $p_h < 2p_m$, if $p_h(2\hat{p}_m - p_h) > p_m^2$, then (a) if $p_m/\hat{p}_m < 4/5$, LF will offer $\{ap_m^2/2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2}), \frac{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}{p_m^2}\}$ instead of $\{ap_h/2, 2/p_h\}$ (which it would offer if $p_h(2\hat{p}_m - p_h) \le p_m^2$); (b) if $p_m/\hat{p}_m \ge 4/5$, LF will offer $\{a\hat{p}_m - (1-q)ap_m/4, 4/(4\hat{p}_m - (1-q)p_m)\}$ instead of $\{ap_h/2, 2/p_h\}$ (which it would offer if $p_h(2\hat{p}_m - p_h) > p_m^2$).

Proof. So, to deter a medium LF from pretending to have received a high signal, in case (A) when LF receives a high signal it must increase L by $[(\hat{p}_m - \hat{p}_h) - (1-q)p_m/4]a$. Thus, LF's optimal contract when it receives a high signal and $2\hat{p}_h \le p_h$ or $q \ge (2\hat{p}_h - p_h)^2/{p_h}^2$ is $\{a(\hat{p}_m - (1-q)p_m/4), 1/(\hat{p}_m - (1-q)p_m/4)\}$.

Next, consider case (B) ($2\hat{p}_h > p_h$ and $q < (2\hat{p}_h - p_h)^2/{p_h}^2$). Again, LF's profit when it has a medium signal but offers the high signal contract must be no greater than LF's profit if it offers the medium signal contract (which is $(1-q)ap_m/4$). Recall from the proof of Proposition 1, if $p_h/2 \ge p_m$, then P will accept the unconstrained high signal contract in this case for any discount rate. Thus, if we increase L while keeping $rL = a$, we do not affect the probability that P accepts the contract. In this case, (B)(i) we need to increase L by $(2\hat{p}_m - p_h)a/2 - (1-q)ap_m/4$ in the high signal contract, while keeping $rL = a$, in order to prevent the medium signal LF from offering the high signal contract.[18]

[18] This will actually reduce LF's profit when it has the high signal even less because reducing r and increasing L will increase the probablity that P will accept the offer.

If $p_h/2 < p_m$, (B)(ii) in the Proposition, however, the analysis is more complicted because increasing L and decreasing r will increase the probability that P will accept the high signal contract when LF received a medium signal. For an offer of $\{a/r, r\}$ that makes the court (wrongly) believe that LF received the high signal, P's profit from accepting versus rejecting it is $a/r - p_m a\beta$, so the probability that P accepts is $(1-q)/rp_m$ (assuming $1/rp_m < 1$ so that P does not accept with probability one). LF's profit from this contract is $(1-q)(\hat{p}_m r - 1)a/r^2 p_m$. Setting this equal to LF's profit from offering a truthfully-revealing contract, we obtain $4(\hat{p}_m r - 1) = r^2 p_m^2$, which gives $r = \frac{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}{p_m^2}$.

This solution is only valid if $1/rp_m < 1$, otherwise the probability of acceptance is one, so our profit function is not correct. If we let $z = p_m/\hat{p}_m$, then $1/rp_m = z/(2 - 2\sqrt{1-z^2})$ if $r = \frac{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}{p_m^2}$. This is less than one if and only if $z < 4/5$. So, if $p_m/\hat{p}_m < 4/5$ (and we are in case (B)), then if LF receives a high signal, it must offer a contract of $\{ap_m^2/2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2}), \frac{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}{p_m^2}\}$.

Now consider case (B) where $p_m/\hat{p}_m \geq 4/5$. Then LF's profit from a contract $\{a/r, r\}$ that would convince the court that LF received a high signal that P accepts with probability one is $(\hat{p}_m r - 1)a/r$. Setting this equal to the profit from the truthfully revealing contract gives $r = 4/(4\hat{p}_m - (1-q)p_m)$ and $L = (4\hat{p}_m - (1-q)p_m)a/4$. Q.E.D. ■

When the no-mimicking constraint in binding, the optimal contract when LF receives the high signal is determined by the profit this contract would give LF if it received the medium signal. This latter profit must be equal to LF's profit from offering the medium-signal contract. While the conditions under which the no-mimicking constraint binds differs among the cases, the optimal contract when the constraint binds is the same in all the cases except for (B)(ii)(a). The reason for that is that, except in (B)(ii)(a), the contract that satisfies the no-mimicking constraint at equality is one that P accepts even if it does not discount the future. When this holds, there is only one high-signal contract with $Lr = a$ that gives LF with a medium signal exactly the same profit as it would get if it offered the medium-signal contract. In (B)(ii)(a), however, the interest rate for the contract that satifies the no-mimicking constraint at equality is high enough that P only accepts if it discounts the future sufficiently. Since this contract is not accepted with probability one, the interest rate can be higher and still not provide LF an incentive to mimick when it gets the medium signal.

The following corollary details how the need to deter mimicking can expand the range of discount factors for which P accepts a funding contract from LF when LF receives a high signal.

Corollary 5 *Assume LF receives a high signal.*

(A) For $2\hat{p}_h \leq p_h$ or $q > (2\hat{p}_h - p_h)^2/{p_h}^2$, P accepts a funding contract from LF whether or not the no-mimmicking constraint binds.

(B) (i) For $q < (2\hat{p}_h - p_h)^2/{p_h}^2$ and ($2p_m \leq p_h < 2\hat{p}_h$ or ($p_h < 2p_m$ and $p_m/\hat{p}_m \geq 4/5$)), if the no-mimmicking constraint binds, then P will accept a

funding contract from LF for any discount factor, whereas if the no-mimmicking constraint does not bind, P would only accept if her discount factor was $\beta \leq \frac{p_h}{2\hat{p}_h}$.

(B) (ii) For $q < (2\hat{p}_h - p_h)^2/p_h{}^2$, $p_h < 2p_m$, *and* $p_m/\hat{p}_m < 4/5$, *if the no-mimmicking constraint binds, then P will accept a funding contract from LF if her discount factor is* $\beta \leq \frac{p_m}{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}$, *whereas if the no-mimmicking constraint does not bind, P would only accept if her discount factor was* $\beta \leq \frac{p_h}{2\hat{p}_h}$.

As long as a high discount factor P would not accept LF's optimal unconstrained contract, a binding no-mimmicking constraint will expand the range of discount factors that accept a contract offer from LF when LF receives a high signal. Because the no-mimmicking constraint requires that LF offer a lower interest rate, this makes the contract more attractive to P. So, if LF's market power was causing it to raise interest rates high enough that some P-types inefficiently decided not to accept the funding contract, a binding no-mimmicking constraint reduces the interest rate and expands the range of P-types that accept the contract. This is efficient since P discounts the future and LF does not (in addition to any accuracy benefits that come from the information the contract provides to the court).

Notice from the collorlary that the efficiency benefits from making the contract between LF and P admissible only hold when $2\hat{p}_h > p_h$. Thus, it is important to determine in what situations we are more likely to have $2\hat{p}_h > p_h$. The following proposition shows that as the signals get more accurate (in a particular way), $2\hat{p}_h > p_h$ is more likely, and thus the lower interest rates that result when the no-mimmicking constraint binds are more likely to have efficiency benefits.

Proposition 6 *Let* $\hat{g}_h(s)$ *be a transformation of* $g_h(s)$ *such that* $\int_0^1 f(s)[g_h(s) - \hat{g}_h(s)]ds = 0$ *and* $g_h(s) > (<,=)\hat{g}_h(s)$ *if and only if* $s > (<,=)\hat{s}$ *and let* $\hat{g}_m(s) = g_m(s)$. *Let* $\tilde{s}$ *be implicitly defined by* $2g_h(\tilde{s}) = g_m(\tilde{s})$. *If* $\tilde{s} < 1$ *and* $\hat{s} \geq \tilde{s}$, *then if* $2\hat{p}_h > p_h$ *under signal* $\hat{g}_h(s)$, *then* $2\hat{p}_h > p_h$ *under signal* $g_h(s)$.

Proof. $2\hat{p}_h - p_h = 2\frac{\int_0^1 f(s)g_h(s)g_h(s)ds}{\int_0^1 f(s)g_h(s)ds} - \frac{\int_0^1 f(s)g_h(s)(g_h(s)+g_m(s))ds}{\int_0^1 f(s)g_h(s)ds} = \frac{\int_0^1 f(s)g_h(s)(g_h(s)-g_m(s))ds}{\int_0^1 f(s)g_h(s)ds}$.
So $\{2\hat{p}_h - p_h\}_{g_h} - \{2\hat{p}_h - p_h\}_{\hat{g}_h} = \frac{\int_0^1 f(s)g_h(s)(g_h(s)-g_m(s))ds}{\int_0^1 f(s)g_h(s)ds} - \frac{\int_0^1 f(s)\hat{g}_h(s)(\hat{g}_h(s)-g_m(s))ds}{\int_0^1 f(s)\hat{g}_h(s)ds}$. This

has the same sign as ■

$$\int_0^1 f(s)\hat{g}_h(s)ds \int_0^1 f(s)g_h(s)(g_h(s)-g_m(s))ds - \int_0^1 f(s)g_h(s)ds \int_0^1 f(s)\hat{g}_h(s)(\hat{g}_h(s)-g_m(s))ds =$$

$$\int_0^1 f(s)\hat{g}_h(s)ds\{\int_0^1 f(s)g_h(s)(g_h(s)-g_m(s))ds - \int_0^1 f(s)\hat{g}_h(s)(\hat{g}_h(s)-g_m(s))ds\}+$$

$$\{\int_0^1 f(s)\hat{g}_h(s)ds - \int_0^1 f(s)g_h(s)ds\} \int_0^1 f(s)\hat{g}_h(s)(\hat{g}_h(s)-g_m(s))ds =$$

$$\int_0^1 f(s)\hat{g}_h(s)ds \int_0^1 f(s)[g_h(s)+\hat{g}_h(s)-g_m(s)][g_h(s)-\hat{g}_h(s)]ds -$$

$$\int_0^1 f(s)[g_h(s)-\hat{g}_h(s)]ds \int_0^1 f(s)\hat{g}_h(s)(\hat{g}_h(s)-g_m(s))ds$$

$\int_0^1 f(s)[g_h(s)-\hat{g}_h(s)]ds = 0$ implies that this has the sign of:

$$\int_0^1 f(s)[g_h(s)+\hat{g}_h(s)-g_m(s)][g_h(s)-\hat{g}_h(s)]ds =$$

$$\int_0^{\hat{s}} f(s)[g_h(s)+\hat{g}_h(s)-g_m(s)][g_h(s)-\hat{g}_h(s)]ds + \int_{\hat{s}}^1 f(s)[g_h(s)+\hat{g}_h(s)-g_m(s)][g_h(s)-\hat{g}_h(s)]ds$$

We make the following claim.

Claim 7 *If $\hat{s} \geq \tilde{s}$, then $g_h(\hat{s})+\hat{g}_h(\hat{s})-g_m(\hat{s}) > g_h(\tilde{s})+\hat{g}_h(\tilde{s})-g_m(\tilde{s}) > 0$ and $g_h(s)+\hat{g}_h(s)-g_m(s)$ is strictly increasing in s for all $s > \tilde{s}$.*

Proof. The first two equalities follow naturally from the definitions of $\tilde{s}$ and $\hat{g}$. To prove the last part, notice that MLRP implies that $\hat{g}'_h(s)\frac{g_m(s)}{\hat{g}_h(s)} - g'_m(s) = 2\hat{g}'_h(s)\frac{g_m(s)}{2\hat{g}_h(s)} - g'_m(s) > 0$. By MLRP, we know that $\frac{g_m(s)}{2\hat{g}_h(s)}$ is decreasing in s, hence $\frac{g_m(\tilde{s})}{2\hat{g}_h(\tilde{s})} < \frac{g_m(\tilde{s})}{2g_h(\tilde{s})} = 1$ and $\frac{g_m(s)}{2\hat{g}_h(s)} < 1$ for all $s > \tilde{s}$. This implies that $2\hat{g}'_h(s) - g'_m(s) > 0$ for all $s > \tilde{s}$. The same argument also proves that $2g'_h(s) - g'_m(s) > 0$ for all $s > \tilde{s}$. This means that $g_h(s)+\hat{g}_h(s)-g_m(s)$ is increasing in s for all $s > \tilde{s}$. Q.E.D. ■

Thus, $g_h(s)+\hat{g}_h(s)-g_m(s)$ reaches a minimum at $\hat{s}$ over $s \in [\hat{s}, 1]$. Furthermore, we know that $g_h(\hat{s})+\hat{g}_h(\hat{s})-g_m(\hat{s}) = 2\hat{g}_h(\hat{s})-g_m(\hat{s})$ and $g_h(s)+\hat{g}_h(s)-g_m(s) < 2\hat{g}_h(s)-g_m(s)$ for all $s < \hat{s}$. Because $2\hat{g}'_h(s)\frac{g_m(s)}{2\hat{g}_h(s)} - g'_m(s) > 0$, we know that $2\hat{g}_h(s)-g_m(s)$ is increasing in s whenever it is positive (since $\frac{g_m(s)}{2\hat{g}_h(s)} < 1$ whenever $2\hat{g}_h(s)-g_m(s) > 0$). Thus, $2\hat{g}_h(s)-g_m(s)$ reaches a maximum at $\hat{s}$ over $s \in [0, \hat{s}]$. Since $g_h(\hat{s})+\hat{g}_h(\hat{s})-g_m(\hat{s}) = 2\hat{g}_h(\hat{s})-g_m(\hat{s})$ and $g_h(s)+\hat{g}_h(s)-g_m(s) < 2\hat{g}_h(s)-g_m(s)$ for all $s < \hat{s}$, this means that $g_h(s)+\hat{g}_h(s)-g_m(s)$ also reaches a maximum at $\hat{s}$ over $s \in [0, \hat{s}]$. Since

$g_h(s) - \hat{g}_h(s) < 0$ on $s \in [0, \hat{s}]$ and $g_h(s) - \hat{g}_h(s) > 0$ on $s \in [\hat{s}, 1]$, we have

$$\int_0^{\hat{s}} f(s)[g_h(s) + \hat{g}_h(s) - g_m(s)][g_h(s) - \hat{g}_h(s)]ds + \int_{\hat{s}}^1 f(s)[g_h(s) + \hat{g}_h(s) - g_m(s)][g_h(s) - \hat{g}_h(s)]ds >$$

$$g_h(\hat{s}) + \hat{g}_h(\hat{s}) - g_m(\hat{s})\{\int_0^{\hat{s}} f(s)[g_h(s) - \hat{g}_h(s)]ds + \int_{\hat{s}}^1 f(s)[g_h(s) - \hat{g}_h(s)]ds\} = 0$$

We have now proved that if $2\hat{p}_h - p_h > 0$ for signal $\hat{g}_h$ then $2\hat{p}_h - p_h > 0$ for signal g_h. Q.E.D.

In this proposition, we consider an increase in the accuracy of the signal of the following form. For case strength above some cutoff, we increase the probability of getting a high signal and reduce the probability of getting a low signal, without changing the probability of getting a medium signal. We do the reverse below this cutoff. The proposition shows that as long as this cutoff exceeds the case strength at which one is twice as likely to get the medium signal as the high signal, then it is easier for $2\hat{p}_h - p_h > 0$ with the more accurate signal than with the less accurate one. This in turn expands the range of conditions under which a binding no-mimicking constraint will increase the probability of funding contract being accepted when LF receives a high signal.

Of course, this proposition does not say that admissible contracts are more likely to be efficiency-enhancing when the signal is more accurate. To answer this question, we also have to examine how the accuracy of the decision affects the range of parameters for which the no-mimmicking constraint is binding. For it is only when this constraint is binding that the admissibility of the contract will lead to lower interest rates. We will examine this issue in a later draft.

5 Conclusion

In this paper, we have shown that making litigation funding contracts admissible can reduce the ability of a litigation funder to exploit its market power by charging high interest rates. This happens when the funder obtains a favorable signal of the strength of the plaintiff's case and wants the contract to be evidence of this favorable signal in order to increase the plaintiff's probability of winning. Because the funder has an interest in the plaintiff prevailing, it only gets paid if the plaintiff wins, the funder would always like to convince the court its signal was favorable. Thus, in some circumstances, in order to deter a funder with a less favorable signal from mimicking the contract it would offer had it really received a favorable signal, the funder must charge a lower than otherwise profit-maximizing interest rate when it receives a favorable signal. This interest rate reduction may then lead to more plaintiffs taking advantage of third party litigation funding. This is efficient since the plaintiff has a greater immediate need for money than does the funder. Thus, our paper suggests that while third party litigation funders should not be able to directly reveal the basis for their evaluation of the strength of the plaintiff's case, allowing the plaintiff to signal this information through admitting the contract itself into evidence can improve social welfare.

Of course, there are many other issues that third party litigation funding raises. Our paper only tackles one, previously ignored, effect. In so doing, we explicitly do not consider settlement. Third party litigation funding raises interesting questions regarding its effects on the agency conflicts present in settlement. We leave that issue for future work.

There are other issues discussed in the literature that we also left out of the model. First, as was mentioned above a secondary market has been recently developed. Should the funder be allowed to securitize its claim and sell it in a second market? Because the funder is passive in our model, this would make no difference. If funders sometimes exercise control over some aspects of a suit, such packaging of legal claim-backed securities might change funder's incentives, altering, but certainly not eliminating, the agency conflicts that affect settlement. Selling the case in the secondary market might also dilute the signaling property of the regime.

We also do not fully address the ultimate welfare question since we do not analyze how third party litigation funding affects primary behavior. One might conjecture that under third party funding regime, more lawsuits will be considered than without it (because third party funding makes it, ex ante, more beneficial). Our model implies however that the average quality of the cases filed and not dropped will increase due to the increase in courts' accuracy. This in turn will incentivize defendant to take more care, which might eventually lead to fewer accidents and fewer claims filed. If the additional litigation provides increased incentives to defendants to avoid accidents, then the increase in litigation could increase social welfare.

Third, the third party litigation funding regime might distort plaintiff's incentives to seek other (non monetary) remedies such as an injunction. Funders will not be interested in funding such cases, and plaintiffs will lose the signaling benefit of a funder. As a result they will seek more damage awards than before. Formal analysis of all these questions are also left for future research.

6 Appendix–Conditions for Court Behavior

In the model, we have assumed that the court will rule for the plaintiff if and only if it observes $\{h, h\}, \{h, m\}$, $\{m, h\}$ or $\{\varnothing, h\}$ where the first element is the inferred signal from the contract between LF and P and the last element is the court's own signal. Here we establish the conditions under which this is the case. Because the LF's and the court's signals are equally accurate, and satisfy MLRP, we need to establish the conditions under which $\Pr[s \geq \bar{s} \mid \{m, h\}] > 1/2$, $\Pr[s \geq \bar{s} \mid \{\varnothing, h\}] > 1/2$, $\Pr[s \geq \bar{s} \mid \{m, m\}] \leq 1/2$, and $\Pr[s \geq \bar{s} \mid \{\varnothing, m\}] \leq 1/2$.

We assume that the P's litigation costs are small enough that it does not drop the case if it obtains a medium (or high) signal from LF. We say the probability that P drops the case if she obtains a low signal is given by $\gamma \in [0, 1]$. If LF's signal was low, the probability the case would come to court with no evidence of a contract is $1 - \gamma$. If LF's signal was medium, the probability the case would come to court with no evidence of a contract is $(1+q)/2$.

If LF's signal was high, the probability the case would come to court with no evidence of a contract is 0 if (i) $2\hat{p}_h \leq p_h$ or $q > (2\hat{p}_h - p_h)^2/{p_h}^2$; (ii) $2p_m \leq p_h < 2\hat{p}_h$ and $(2\hat{p}_m - p_h) \leq (1-q)p_m/2$; or (iii) $p_h < 2p_m$, $p_m/\hat{p}_m \geq 4/5$, and $p_h(2\hat{p}_m - p_h) > p_m^2$. If LF's signal was high, the probability the case would come to court with no evidence of a contract is $1 - \frac{(1-q)p_h}{2\hat{p}_h}$ if $2\hat{p}_h > p_h, q < (2\hat{p}_h - p_h)^2/{p_h}^2$ and (i) $(2\hat{p}_m - p_h) \leq (1-q)p_m/2$ if $p_h/2 \geq p_m$ or (ii) $p_h(2\hat{p}_m - p_h) \leq p_m^2$ if $p_h/2 < p_m$. If LF's signal was high, the probability the case would come to court with no evidence of a contract is $1 - \frac{(1-q)p_m}{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}$ if $2p_m > p_h, q < (2\hat{p}_h - p_h)^2/{p_h}^2$, $p_m/\hat{p}_m < 4/5$ and $p_h(2\hat{p}_m - p_h) > p_m^2$.

First, consider the case in which P never rejects a high signal contract. Then for any $\gamma < 1$, having no contract will be a worse signal than having a medium signal. In this case, it is sufficient to show that $\Pr[s \geq \bar{s} \mid \{\varnothing, h\}] > 1/2$ and $\Pr[s \geq \bar{s} \mid \{m, m\}] \leq 1/2$. If the court sees no contract in this case and then observes a high signal, its posterior is $\Pr[s \geq \bar{s} \mid \{\varnothing, h\}] = \frac{\int_{\bar{s}}^1 f(s)[g_m(s)(1+q)/2 + (1-\gamma)g_l(s)]g_h(s)ds}{\int_0^1 f(s)[g_m(s)(1+q)/2 + (1-\gamma)g_l(s)]g_h(s)ds}$. If the court sees a contract that indicates a medium signal, then its posterior given a medium signal is $\Pr[s \geq \bar{s} \mid \{m, m\}] = \frac{\int_{\bar{s}}^1 f(s)g_m(s)g_m(s)ds}{\int_0^1 f(s)g_m(s)g_m(s)ds}$.

Next, consider the case in which P rejects a high signal contract with probability $1 - \frac{(1-q)p_h}{2\hat{p}_h}$. If the court sees no contract in this case and then observes a high signal, its posterior is $\Pr[s \geq \bar{s} \mid \{\varnothing, h\}] = \frac{\int_{\bar{s}}^1 f(s)[g_h(s)(1 - \frac{(1-q)p_h}{2\hat{p}_h}) + g_m(s)(1+q)/2 + (1-\gamma)g_l(s)]g_h(s)ds}{\int_0^1 f(s)[g_h(s)(1 - \frac{(1-q)p_h}{2\hat{p}_h}) + g_m(s)(1+q)/2 + (1-\gamma)g_l(s)]g_h(s)ds}$. If the court sees no contract in this case and then observes a medium signal, its posterior is $\Pr[s \geq \bar{s} \mid \{\varnothing, m\}] = \frac{\int_{\bar{s}}^1 f(s)[g_h(s)(1 - \frac{(1-q)p_h}{2\hat{p}_h}) + g_m(s)(1+q)/2 + (1-\gamma)g_l(s)]g_m(s)ds}{\int_0^1 f(s)[g_h(s)(1 - \frac{(1-q)p_h}{2\hat{p}_h}) + g_m(s)(1+q)/2 + (1-\gamma)g_l(s)]g_m(s)ds}$. If the court sees a contract that indicates a medium signal, then its posterior given a high signal is $\Pr[s \geq \bar{s} \mid \{m, h\}] = \frac{\int_{\bar{s}}^1 f(s)g_m(s)g_h(s)ds}{\int_0^1 f(s)g_m(s)g_h(s)ds}$.

Lastly, consider the case in which P rejects a high signal contract with probability $1 - \frac{(1-q)p_m}{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}$. If the court sees no contract in this case and then observes a high signal, its posterior is

$$\Pr[s \geq \bar{s} \mid \{\varnothing, h\}] = \frac{\int_{\bar{s}}^1 f(s)[g_h(s)(1 - \frac{(1-q)p_m}{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}) + g_m(s)(1+q)/2 + (1-\gamma)g_l(s)]g_h(s)ds}{\int_0^1 f(s)[g_h(s)(1 - \frac{(1-q)p_m}{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}) + g_m(s)(1+q)/2 + (1-\gamma)g_l(s)]g_h(s)ds}$$

If the court sees no contract in this case and then observes a medium signal, its posterior is $\Pr[s \geq \bar{s} \mid \{\varnothing, m\}] = \frac{\int_{\bar{s}}^1 f(s)[g_h(s)(1 - \frac{(1-q)p_m}{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}) + g_m(s)(1+q)/2 + (1-\gamma)g_l(s)]g_m(s)ds}{\int_0^1 f(s)[g_h(s)(1 - \frac{(1-q)p_m}{2(\hat{p}_m - \sqrt{\hat{p}_m^2 - p_m^2})}) + g_m(s)(1+q)/2 + (1-\gamma)g_l(s)]g_m(s)ds}$.

Thus, the conditions for which the court will rule for the plaintiff if and only if it observes $\{h, h\}, \{h, m\}$, $\{m, h\}$ or $\{\varnothing, h\}$ are as follows:

Condition 8 *(A) If (i)* $2\hat{p}_h \leq p_h$ *or* $q > (2\hat{p}_h - p_h)^2/{p_h}^2$*; (ii)* $2p_m \leq p_h < 2\hat{p}_h$ *and* $(2\hat{p}_m - p_h) \leq (1-q)p_m/2$*; or (iii)* $p_h < 2p_m$*,* $p_m/\hat{p}_m \geq 4/5$*, and* $p_h(2\hat{p}_m -$

$p_h) > p_m^2$, *then* $\Pr[s \geq \bar{s} \mid \{\varnothing, h\}] = \frac{\int_{\bar{s}}^1 f(s)[g_m(s)(1+q)/2+(1-\gamma)g_l(s)]g_h(s)ds}{\int_0^1 f(s)[g_m(s)(1+q)/2+(1-\gamma)g_l(s)]g_h(s)ds} > 1/2$ *and* $\Pr[s \geq \bar{s} \mid \{m, m\}] = \frac{\int_{\bar{s}}^1 f(s)g_m(s)g_m(s)ds}{\int_0^1 f(s)g_m(s)g_m(s)ds} \leq 1/2.$

(B) If $2\hat{p}_h > p_h, q < (2\hat{p}_h - p_h)^2/{p_h}^2$ *and (i)* $(2\hat{p}_m - p_h) \leq (1-q)p_m/2$ *if* $p_h/2 \geq p_m$ *or (ii)* $p_h(2\hat{p}_m - p_h) \leq p_m^2$ *if* $p_h/2 < p_m$, *then* $Min\{\Pr[s \geq \bar{s} \mid \{\varnothing, h\}] = \frac{\int_{\bar{s}}^1 f(s)[g_h(s)(1-\frac{(1-q)p_h}{2\hat{p}_h})+g_m(s)(1+q)/2+(1-\gamma)g_l(s)]g_h(s)ds}{\int_0^1 f(s)[g_h(s)(1-\frac{(1-q)p_h}{2\hat{p}_h})+g_m(s)(1+q)/2+(1-\gamma)g_l(s)]g_h(s)ds}, \Pr[s \geq \bar{s} \mid \{m, h\}] = \frac{\int_{\bar{s}}^1 f(s)g_m(s)g_h(s)ds}{\int_0^1 f(s)g_m(s)g_h(s)ds}\} > 1/2$ *and* $Max\{\Pr[s \geq \bar{s} \mid \{m, m\}] = \frac{\int_{\bar{s}}^1 f(s)g_m(s)g_m(s)ds}{\int_0^1 f(s)g_m(s)g_m(s)ds}, \Pr[s \geq \bar{s} \mid \{\varnothing, m\}] = \frac{\int_{\bar{s}}^1 f(s)[g_h(s)(1-\frac{(1-q)p_h}{2\hat{p}_h})+g_m(s)(1+q)/2+(1-\gamma)g_l(s)]g_m(s)ds}{\int_0^1 f(s)[g_h(s)(1-\frac{(1-q)p_h}{2\hat{p}_h})+g_m(s)(1+q)/2+(1-\gamma)g_l(s)]g_m(s)ds}\} \leq 1/2.$

(C) If $2p_m > p_h, q < (2\hat{p}_h - p_h)^2/{p_h}^2$, $p_m/\hat{p}_m < 4/5$ *and* $p_h(2\hat{p}_m - p_h) > p_m^2$, *then* $Min\{\Pr[s \geq \bar{s} \mid \{\varnothing, h\}] = \frac{\int_{\bar{s}}^1 f(s)[g_h(s)(1-\frac{(1-q)p_m}{2(\hat{p}_m-\sqrt{\hat{p}_m^2-p_m^2})})+g_m(s)(1+q)/2+(1-\gamma)g_l(s)]g_h(s)ds}{\int_0^1 f(s)[g_h(s)(1-\frac{(1-q)p_m}{2(\hat{p}_m-\sqrt{\hat{p}_m^2-p_m^2})})+g_m(s)(1+q)/2+(1-\gamma)g_l(s)]g_h(s)ds}, \Pr[s \geq \bar{s} \mid \{m, h\}] = \frac{\int_{\bar{s}}^1 f(s)g_m(s)g_h(s)ds}{\int_0^1 f(s)g_m(s)g_h(s)ds}\} > 1/2$ *and* $Max\{\Pr[s \geq \bar{s} \mid \{m, m\}] = \frac{\int_{\bar{s}}^1 f(s)g_m(s)g_m(s)ds}{\int_0^1 f(s)g_m(s)g_m(s)ds}, \Pr[s \geq \bar{s} \mid \{\varnothing, m\}] = \frac{\int_{\bar{s}}^1 f(s)[g_h(s)(1-\frac{(1-q)p_m}{2(\hat{p}_m-\sqrt{\hat{p}_m^2-p_m^2})})+g_m(s)(1+q)/2+(1-\gamma)g_l(s)]g_m(s)ds}{\int_0^1 f(s)[g_h(s)(1-\frac{(1-q)p_m}{2(\hat{p}_m-\sqrt{\hat{p}_m^2-p_m^2})})+g_m(s)(1+q)/2+(1-\gamma)g_l(s)]g_m(s)ds}\} \leq 1/2.$

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