Conditional Fees and Litigation

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Abstract

Many jurisdictions in the UK and Australia now allow conditional fee arrangements between lawyers and their clients. Under conditional fees, the lawyer receives an upscale premium if the case is won, and nothing if the case is lost. In this article, we compare hourly and conditional fees regarding their effects on the litigants' legal expenditures and incentives to reach a pre-trial settlement in a framework where litigation is modeled as an auction. The main result shows that switching from hourly to conditional fees may decrease the parties' legal expenditures if the upscale premium is large enough. However, it may have a perverse effect by deterring the incentives to settle and, hence, increasing the number of trials under the English fee-shifting rule.

Keywords: Litigation, Fee-shifting rule, Conditional fee arrangement.

JEL codes: D44, K40, K41.

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1. Introduction

Contingent legal fees are widely used in civil lawsuits in the US. Indeed, 92%-98% of individual plaintiffs and 85%-88% of corporate plaintiffs retain their lawyer on a contingency basis in American tort and contract litigation cases (Emons and Fluet, 2013). Under this payment scheme the lawyer gets a share of the judgement if her client wins and nothing if he loses.[1] In Europe such a mechanism was strictly forbidden since *pactum cuota litis* is not allowed by the ethical code of the European Association of Lawyers. Nevertheless, as explained by Emons and Garoupa (2006), market pressure has led some countries (*e.g.* the UK, Belgium and the Netherlands) to allow *conditional* fees. Under conditional fees, the lawyer receives an upscale premium – unrelated to the amount adjudicated – in case of winning, and nothing if the case is lost. More precisely, the winning lawyer gets an hourly rate plus a percentage mark-up over this rate. The major argument raised by governments in favor of this fee schedule was that it would extend access to justice by enabling liquidity-constrained people to get legal advice. Indeed, following Rickman *et al.* (1999), promoting the use of conditional fees would allow to facilitate the transfer of a wide range of civil lawsuits from the legal aid system to the private sector. This issue is overriding from a welfare perspective since the legal aid mechanism consumes substantial public resources. For example, legal aid expenditure increased by 65% in France between 2000 and 2010, and by 635% in the UK between 1984 and 1994 (Gray, 1994).

However, in this paper, we show that switching from hourly to conditional fees may decrease the parties' legal expenditures if the upscale premium is large enough. From this perspective, it seems to be undesirable to limit the value of the premium by a cap, as it is the case in UK (resp. Australia) where the mark-up portion of conditional fees is 100% (resp. 25%). Simultaneously, the switchover from hourly to conditional fees, under the English fee-shifting rule, may have a perverse effect by deterring the incentives to settle and, hence, increasing the number of trials.

These results are obtained in a framework where the litigation process is modeled as an auction in which the legal ownership of a disputed asset is unknown to the court.[2] In other words, the court observes only the quality of the case presented by each litigant who may influence the court's decision by hiring an attorney presenting arguments and evidence. This framework follows and extends the analysis by Baye *et al.* (2005) who

[1] We use the pronon 'she' to refer to the lawyer and 'he' to refer to the client.

[2] As mentioned by Klemperer (1999), many economic situations can be modelled as all-pay auctions, including litigation.

ignore the role of fee arrangement and focus on the legal expenditure incentives created by various fee-shifting rules, such as the English *versus* American rule. The American rule implies that each party bears its own litigation costs, while the winner's costs are shifted to the loser under the English rule.

In this context, the main contribution of our paper is twofold.

First, although our framework is based on some restrictive assumptions, we think that the results may contribute to the growing debate in European countries (*e.g.* Spain, France, Italy, and Portugal) over the opportunity to introduce conditional fees. Indeed, whether conditional fees result in higher or lower expenditure than hourly fees is important as it directly impacts on whether the underlying public policy goals for implementing conditional fees are likely to be realized. In particular, since the lawyer?s conditional fee is a marked-up price paid by the client, then switching from hourly to conditional fees may in fact reduce the client?s access to justice if his trial expenditures increase significantly.

Second, our results shed new light on the possible influence of conditional fee arrangement in the litigation process since the existing literature has mostly addressed the use of this arrangement as a way to improve the lawyer-client relationship (by aligning the interests between the client and his lawyer). Emons and Garoupa (2006) highlight that conditional fees may alleviate the moral hazard problem and incite the lawyer to exert effort by tying her fees to the trial's outcome. Nevertheless, contingent fees are shown to be more efficient since the attorney gets a share of the judgement and, hence, uses her information about the amount at stake to adjust her effort, which is not the case with conditional fees. The agent with more information is thus made residual claimant under a contingent payment. In a set-up where the lawyer chooses on how the case is presented to the court, Emons (2006) shows notably that the conditional fee schedule incites the lawyer to choose a *safe* strategy which provides a high probability of winning with a low adjudication (while a *risky* strategy leads to a lower probability of winning with a higher judgement). Indeed, under conditional fees, the only contingencies of interest to the attorney is winning or losing, hence she has an incentive to maximize the probability of winning by playing safe. In this situation, a risk-averse client may seeks insurance through a conditional fee arrangement when it is allowed. Overall, the literature shows that both conditional and contingent fees may be seen as relevant risk-sharing mechanisms: some of the risk is shifted from the more risk-averse client to the – presumably – less risk-averse lawyer, due to the fact that it is easier for her to diversify the risks from trials (see Posner, 1986 for a discussion of this aspect concerning contingent fees). From a welfare perspective, Gabuthy and Lambert (2011) highlight that the conditional fee schedule may improve the efficiency of legal systems by undermining frivolous suits.[3] Indeed, the marked-up price which is paid to the attorney in case of settlement increases the amount needed to induce a truly injured plaintiff to settle. The settlement amount that the defendant must pay under conditional fees is then higher than under hourly fees which makes them less willing to settle and, hence, reduces the expected return from filing a frivolous suit. To the best of our knowledge, the only article addressing the impact of conditional fees on trial expenditures is the one by Hyde (2006). However, this analysis differs from ours in two main respects. First, the author assumes a complete information environment, while we consider that each litigant's valuation of the disputed asset is private information, unobserved by the other party and the court. Furthermore, we analyze a larger span of the dispute resolution process by endogenising parties' expenditures as well as decisions to go to trial, while Hyde ignores the possibility of pre-trial settlement. This assumption may seem somewhat puzzling given that, in practice, a large number of disputes do not rise the level of lawsuit and end in settlement. Furthermore, total expenditure depends not only on the expenditure per trial but also on the number of trials. The fee arrangement that generates lower expenditures per trial may provide greater payoffs from litigation and, thus, results in more cases being brought to trial, implying a decreasing in social welfare. Our framework enables us to analyze this overall effect by examining incentives to litigate in the first place.

The remainder of the paper is organized as follows. Section 2 lays down the model, and derives our main results concerning the litigants' equilibrium expenditures and incentives to go to trial rather than settle. Section 3 concludes and suggests some possible extensions. Proofs are relegated to the appendix.

2. The model

2.1. Framework. Consider two parties who are involved in a civil dispute regarding the ownership of an indivisible asset. Each party i values the asset at v_i, and these valuations are random variables drawn from a continuous density f with distribution function F over $[0, 1]$. Each party's valuation is private information, while the distribution of valuations is common knowledge. The legal ownership of the asset is unknown to the court who observes only the quality of the case presented by each litigant. In this context, party

[3] A frivolous suit may be defined as a lawsuit that lacks merit and is filed only in the hope of extracting a settlement offer from the defendant (Bebchuk, 1988).

i chooses the quantities (hours) of legal services purchased, $e_i \geq 0$, in order to influence the court's decision. The role of the court is then to examine the evidence presented and to award the asset to one of the litigants. Furthermore, following a standard assumption in literature (see, *e.g.*, Dana and Spier, 1993), we consider that each party bears a fixed amount $k > 0$ which may include the cost of preparing and filing a complaint and the cost associated with the discovery process.

We adopt the ?instrumentalist' approach of the decision-making allocation by considering that the lawyer supplies the technical knowledge and skills necessary to implement the expenditure decision, while the client has the ultimate authority over the objectives. In other words, we assume that the client is able to perfectly control the lawyer's actions and has sufficient expertise to determine the optimal expenditure level.[4] In this context, a party's expenditure is chosen to maximize its expected payoffs from trial, which depends on the fee arrangement implied by the justice system. Indeed, under hourly fees, the client pays his lawyer by the hour whatever the court's decision, while a conditional fee contract involves no payment if the case is lost and a hourly fee plus a bonus rate if the case is won.

Under *hourly fees*, the party i's payoffs are given by:

$$u_i(e_i, e_j, v_i) = \begin{cases} v_i - (k + (1-\alpha)e_i) & \text{if party } i \text{ wins} \\ -(k + e_i + \alpha e_j) & \text{if party } i \text{ loses} \end{cases} \tag{1}$$

where $\alpha \in (0, 1)$ is a fee-shifting parameter which represents the share of the hourly fees that the winner can shift to the loser. Thus, $\alpha = 0$ corresponds to the American rule, while $\alpha = 1$ captures the English one.

Under *conditional fees*, the party i's payoffs are given by:

$$u_i(e_i, e_j, v_i) = \begin{cases} v_i - (k + (1-\alpha)e_i + \beta e_i) & \text{if party } i \text{ wins} \\ -(k + \alpha e_j) & \text{if party } i \text{ loses} \end{cases} \tag{2}$$

where β is the bonus rate paid by the client to his lawyer if the case is won at trial. If the client wins, he bears the non transferable part of his legal expenditures (*i.e.* $1 - \alpha + \beta$). However, following the conditional fee contract and contrary to the hourly fees situation, the client does not bear his own expenditures in case of failure at trial since his lawyer

[4] This approach is standard in literature (see, *e.g.*, Landes, 1971; Shavell, 1982; Katz, 1988). Furthermore, as mentioned in introduction, the issue of attorney control and related agency problems – depending on fee arrangements – is analyzed in several articles and is beyond the scope of our paper.

gets nothing when losing. In practice, the mark-up portion of conditional fees in case of winning cannot be shifted from the winner to the loser (Hyde, 2006). Furthermore, the value of the upscale premium paid by the client to the lawyer (*i.e.* β) is usually limited by a cap, but we do not introduce such a restriction in the model which is exploratory on some aspects. This is for the example the case in UK (resp. Australia) where the mark-up portion of conditional fees is 100% (resp. 25%).

In order to capture the two possible fee structures, we introduce an indicator variable $\mu \in \{0, 1\}$ which enables us to represent the party i's expected payoffs in a general fashion:

$$u_i(e_i, e_j, v_i) = \begin{cases} v_i - (k + (1-\alpha)e_i + \beta e_i) & \text{if party } i \text{ wins} \\ -(k + \mu e_i + \alpha e_j) & \text{if party } i \text{ loses} \end{cases} \quad (3)$$

The hourly fee arrangement is hence characterized by $\mu = 1$ and $\beta = 0$, while the conditional fee schedule corresponds to $\mu = 0$ and $\beta > 0$.

In this context, the party i's probability of prevailing is given by:

$$\phi = \begin{cases} \frac{1+x}{2} & \text{if } e_i \geq e_j \\ \frac{1-x}{2} & \text{if } e_i < e_j \end{cases} \quad (4)$$

where $x \in [0, 1]$ captures the influence of legal expenditures on the court's adjudication. In the case where $x = 0$, the litigants' expenditures do not impact the judge's decision, and $\phi = 1/2$ since the litigation environment is symmetric. Indeed, we implicitly assume that the lawyers have equal ability and neither party has an advantage with respect to the evidentiary or legal merits. Following Waldfogel (1998), this simplifying assumption may have some empirical relevance since the pre-trial adjudication process tends to remove asymmetries between litigants.[5] In contrast, when $x = 1$, the outcome at trial depends only upon the litigants' outlays, and party i (resp. j) wins if $e_i > e_j$ (resp. $e_i < e_j$). The present framework extends the analysis by Baye *et al.* (2005) who assume a deterministic relationship between the player's expenditures and its probability of winning (*i.e.* $x = 1$). Furthermore, we argue that the different values of x may characterize various judicial systems. Where judges have broad leeway to instruct juries, the influence of advocay on each side might be weak, corresponding to a low value for x. In contrast, x would be

[5] See, however, Carbonara and Parisi (2012) who introduce an asymmetric winning function in a different theoretical framework where trial is modeled as a rent-seeking contest. Notice that the Tullock's rent-seeking approach has been widely applied to the analysis of civil litigation (see Parisi and Luppi, 2013, for a survey).

high if, by law or customs, judges were limited to analyze procedural issues. Following the discussion by Parisi (2002), we can refer to the distinction between ?adversarial' and ?inquisitorial' systems implying different roles played by the judge in the conduct of a civil case.

With this framework in place, we now proceed to study the parties' behavior over the litigation process, depending on the fee regime. The first subsection characterizes the equilibrium expenditures on legal services when both parties go to trial, while the second one analyzes the incentives to settle at an earlier stage of the lawsuit. This analysis will allow us to determine the expected total legal expenditure from an *ex-ante* standpoint.

2.2. Equilibrium expenditures. We consider that each litigant chooses his level of expenditure in order to maximize his expected payoffs, and we restrict attention to strictly symmetric, continuous and increasing strategies for the two players. In this static Bayesian game, a *pure* strategy for player i is a function $e_i(v_i)$, where for each valuation v_i in $[0,1]$, $e_i(v_i)$ specifies the action that type i would choose if drawn by Nature. The litigant i's best reply is then defined by the following maximization problem:

$$\max_{e_i} EU(e_i, v_i) = \int_0^1 ((v_i - (k + (1-\alpha)e_i + \beta e_i))P(W) - (k + \mu e_i + \alpha e_j)P(L))\, dF(v_j) \tag{5}$$

where

$$P(W) = \frac{1-x}{2}\text{Prob}(e_i > e_j) + \frac{1+x}{2}\text{Prob}(e_i < e_j)$$

and

$$P(L) = \frac{1-x}{2}\text{Prob}(e_i < e_j) + \frac{1+x}{2}\text{Prob}(e_i > e_j)$$

2.2.1. American rule. We can provide an explicit formulation of the strategic expenditures considering hourly fees:

Lemma 1 *Under American rule, hourly fees imply the following level of expenditure:*

$$e^*_{hf}(v_i) = x \int_0^{v_i} sF'(s)\, ds \tag{6}$$

Proof. See appendix ■

Lemma 2 *Under American rule, conditional fees imply the following level of expenditure, where $P(v_i)$ denotes the probability that a party with value v_i wins the case:*

$$e^*_{cf}(v_i) = \frac{x \int_0^{v_i} sF'(s)\, ds}{(1+\beta)P(v_i)} \tag{7}$$

Proof. See appendix ■

Remark that, obviously, the strategic expenditure does not depend on the level of the filing cost k, and is proportional to x, the influence of legal expenditures on the court's adjudication. It is also inversely proportional to $(1 + \beta)$, the effective payment of the party including the mark-up.

Note also that $e^*_{cf}(v_i) = \frac{e^*_{hf}(v_i)}{(1+\beta)P(v_i)}$. This equality deserves some comments. Note that for a given v_i the level of strategic expenditures can be larger with conditional fees, depending on:

$$\frac{1}{(1+\beta)P(v_i)} \geq 1 \iff \beta \leq \frac{1 - F(v_i)}{F(v_i)}$$

Corollary 1 *From the point of view of the parties, under American rule, hourly and conditional fees induce the same level of expected cost.*

Proof. See appendix. ■

The traditional Revenue Equivalence Theorem of auction theory applies here (see *e.g.* Klemperer (2003) for more details). Nevertheless, the fact that parties adapt the strategic expenditures so that total payment remains unchanged does not imply that both procedures yield the same level of expenditure. More precisely, the party pays the same expected amount but the attorney, with conditional fees bears her own expense in case of succumbing with a lawsuit.

Proposition 1 *Under American rule, the conditional fee arrangement system induces lower expected expenditures if the bonus β is large enough.*

Proof. See appendix ■

This rather counter-intuitive proposition can be easily explained. Adopting conditional fees disconnects the total level of expenditures and the litigation cost to the parties. Consider, for example, the following situation. A party, under hourly fees, has an expenditure of $\$100,000$ and aprobability of winning is $1/2$. Under conditional fees, he will adapt his expenditures such that his total expected cost equals $\$100,000$. Furthermore, consider first the case where $\beta = 1$. An expected cost of $\$100,000$ is reached if the expenditures equals $\$100,000$, exactly the same amount as under hourly fees. Suppose now that $\beta = 1/2$, an expected cost of $\$100,000$ is incurred by the party if the expenditures equals $\$133,000$. Therefore, a lower value of β induces a larger expenditure.

Example 1 *Consider, as for example, that valuations are i.i.d. following an uniform distribution over* $[0,1]$*. Expected expenditures with hourly fees correspond to:*

$$EE_{hf} = 2k + \frac{x}{3},$$

while with conditional fees:

$$EE_{cf} = 2k + \frac{x(2x-1) + (x-1)^2 \tanh^{-1}(x)}{2(\beta+1)x^2}.$$

The minimum level of bonus such that conditional fees yield less expenditures is so given by:

$$\frac{x(-2(x-3)x-3) + 3(x-1)^2 \tanh^{-1}(x)}{2x^3}$$

The following graph gives the level of the threshold depending on x*:*

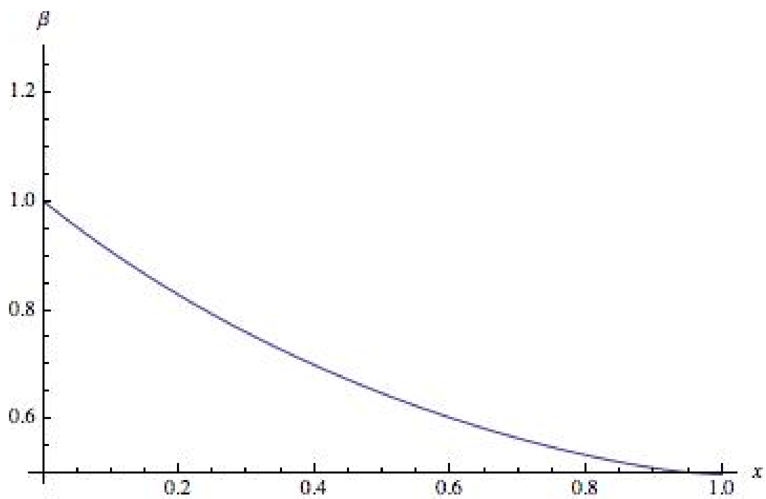

Figure 1: Minimum level of bonus

2.3. English rule.

Lemma 3 *Under English rule, conditional fees imply the following level of expenditure:*

$$e^*_{cf}(v_i) = \frac{x}{\beta P(v_i)} \frac{\int_0^{v_i} s(2P(s))^{-1/\beta}\, dF(s)}{(2P(v_i))^{-1/\beta}} \tag{8}$$

Proof. See appendix ■

Lemma 4 *Under English rule, hourly fees imply the following level of expenditure, where* $Q(v_i)$ *denotes the probability that a party with value* v_i *loose the case:*

$$e^*_{hf}(v_i) = \frac{x}{Q(v_i)^2} \int_0^{v_i} sQ(s)\, dF(s) \tag{9}$$

Proof. See appendix ■

Example 2 *In order to illustrate the expenditures strategies, let us consider that valuations are uniformly distributed, that $x = 8/10$ and that $\beta = 4/10$. The following graph represents the equilibrium level of expenditures respectively with hourly and conditional fees.*

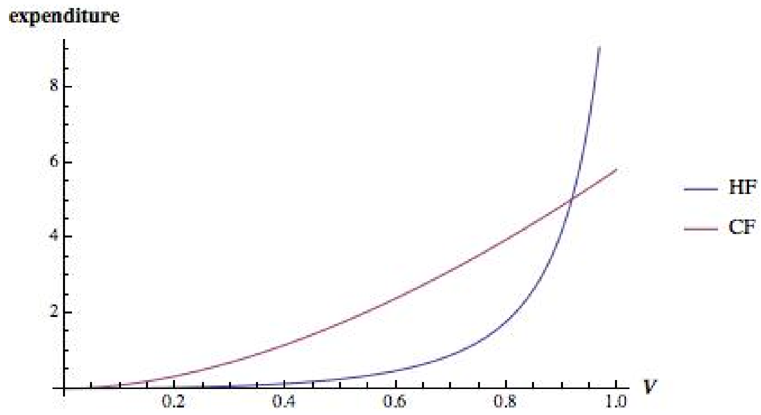

Figure 2: expenditures strategies under English rule

Under hourly fees, a winning party does not pay anything while the loosing one has to pay both expenditures. As the strategies are increasing w.r.t. v_i, a party with a low v_i (*i.e.* a low ex-ante probability of winning) have an incentive to limit the expenditures in order to avoid to incur a high amount of expenditures by losing. To the contrary, a party with a high ex-ante probability of winning is incited to maximize the equilibrium likelihood of winning by increasing his expenditures. The conditional fees mitigate this result by enhancing the weight of the party i's own expenditure on his overall litigation cost.

Corollary 2 *From the point of view of the parties, under English rule, hourly and conditional fees do not induce the same level of expected cost.*

Proof. The Revenue Equivalence Theorem of auction theory does not apply under English rule. Actually, it is no longer true that a party with the lowest possible valuation can spend nothing and lose nothing. Now this party always loses in equilibrium and must pay a fraction of the winner's expenses, so makes negative expected surplus. One of the condition for Revenue Equivalence Theorem now fails. ■

Following Klemperer (2003), "thinking through the logic of the proof of the RET makes clear that all the players are worse off [under English rule] than under [American rule]", but it says nothing in order to compare hourly and conditional fees. [to be completed]
But, as in the previous section, comparing expected payment of the parties does not enable us to compare expected expenditures.

Proposition 2 *Under English rule, the conditional fees arrangement system induces lower expected expenditures if the bonus β is large enough.*

Proof. See appendix ■

2.4. Incentives to settle. We now turn to the case where a pre-trial settlement is possible. Analyzing the individual incentives to settle is important since the total expected expenditures induced by a given fee system depend not only on the expected expenditures per trial under each system – as underlined in the previous subsection – but also on the number of trials induced by each system.
In the pre-trial stage, each disputant compares the expected payoffs he can get from an agreement to the payoffs obtained if trial occurs. Given that the party i's probability of winning is increasing in v_i, we can define a threshold $\tilde{v}$ such that no party with $v_i \leq \tilde{v}$ chooses to go to court. This threshold is defined as the value such that a party with private signal $\tilde{v}$ is indifferent between going to trial (and facing an adversary with a signal greater than $\tilde{v}$ or winning for sure if the other party has a signal $v_j < \tilde{v}$) or settle and obtain the asset with probability 1/2.
Without loss of generality but in order to keep equations tractable, we will consider in the sequel of this subsection that private valuations are uniformly distributed, $F(v_i) = \frac{v-\tilde{v}}{1-\tilde{v}}$.

Proposition 3 *Under Amercian rule, conditional fees and hourly fees provide the same incentives to settle, whatever the level of bonus.*

Proof. This proposition is a direct corollary of the Revenue Equivalence Theorem that applies under standard rules. As the expected utility of the parties are the same, the incentives to settle remain unchanged. A formal proof is given in appendix. ■

Proposition 4 *Under English rule, if the outcome at trial tends to depend only upon the litigants' outlays, conditional fees provide more incentives to settle than hourly fees.*

Proof. See appendix ■

Obviously, the previous proposition refers to polar case. More realistic situations (i.e. $x \ll 1$) imply more mitigated results, depending on the relative value of bonus β, fixed costs c and x. The following example illustrates the incentives to settle, considering uniform distribution of valuations and $x = \frac{1}{2}$.

Example 3 *With $x = \frac{1}{2}$ and $F(v_i) = v_i$, endogenous entry in trial can be determined by considering the threshold value $\tilde{v}$ such that no parties with valuation lower than $\tilde{v}$ have incentives to settle. Basic calculations enable us to determine the equilibrium expenditures of a party with value v_i, respectively under conditional and hourly fees, as:*

$$e_{cf}^{ee*}(v_i) = \frac{2(\beta-1)v_i + \beta(vs-1)(\beta-\beta\tilde{v})^{-1/\beta}((5\beta-2)\tilde{v}-\beta)(\beta(2v_i-3\tilde{v}+1))^{\frac{1}{\beta}-1} + \beta(3\tilde{v}-1)}{2(\beta-1)(2\beta-1)}$$

$$e_{hf}^{ee*}(v_i) = \frac{-4v_i^3 - 3\tilde{v}^2(\tilde{v}-3) + \tilde{v}^2(7\tilde{v}-9)}{3(2v_i+\tilde{v}-3)^2}$$

It enables us to compute the expected utility and determine the threshold values as solutions of

$$EU_{\tilde{v}}(1-F(\tilde{v})) + \tilde{v}F(\tilde{v}) = \frac{1}{2}\tilde{v}F(\tilde{v})$$

The following graph depicts the level of the threshold, respectively under conditional and hourly fees:

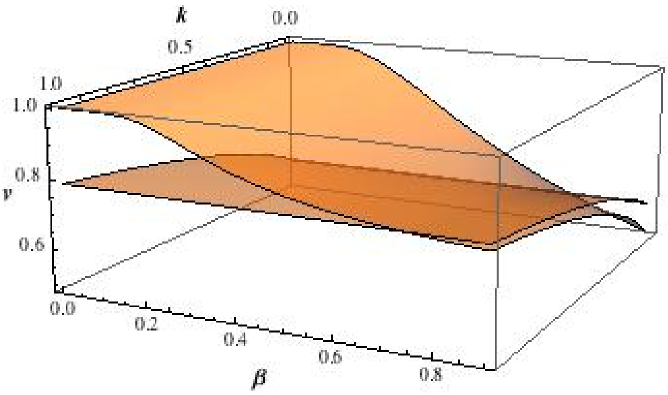

Figure 3: Minimum level of valuation that gives incentives to settle in hourly and conditional fees

3. Conclusion

This paper was motivated by the growing debate in European countries over the opportunity to introduce conditional fees. In this context, we investigated the effects of switching from hourly to conditional fees on litigation expenditures and incentives to reach a pre-trial settlement in a setting where the lawsuit is modeled as an auction. Our model predicts that such a change may incite litigants to decrease their expenditures at trial if the upscale premium is large enough. This prediction may have some implications in terms of legal reforms since introducing conditional fees could have an interesting effect by deterring an over-investment of wasteful resources (if the conditional fee arrangement is designed properly. Furthermore, this result is linked to one public policy motivation for introducing conditional fees, that is the objective to enhance access to justice for litigants who do not have enough assets to hire a lawyer under a regime of hourly fees. However, this switch-over may also have a perverse effect by deterring the incentives to settle and, hence, increasing the number of trials under the English fee-shifting rule.

However, although these results might be relevant for policy-making, our analysis is by no means all-encompassing and several extensions suggest themselves.

First, our model abstracts from many factors that explain why disputes do not settle by focusing the attention on the role of asymmetric information. An interesting (but complicated) extension could incorporate some of these factors, such as attitudes toward risk or divergent litigants' beliefs on the court's decision (given that these beliefs may have both objective and subjective components in practice).

Second, we adopt a *client-controlled* litigation perspective by assuming that the client is able to perfectly control legal expenditures. An alternative view would be to consider a framework where lawyers get the exclusive decision-making authority (Maute, 1984; Choi, 2003) and choose outlays that maximize their own payoffs, depending on the fee schedule in place. Such an extension would imply to integrate agency cost considerations into the comparison between hourly and conditional fees. Under conditional fees, since the lawyer is paid only if she prevails, we can conjecture that there is no need for the client to monitor his lawyer's effort level. However, under hourly fees, some agency costs may arise since the objectives of the litigants and their attorneys are not necessarily congruent. As mentioned by Baik and Kim (2007), the divergence of interests between the client and his lawyer could be overcome by investigating in costly monitoring in order to deal with moral hazard. Overall, such considerations would affect the results by modifying the parties' litigation costs and, then, altering the strategic interaction between them.

Finally, a further step towards realism would be to consider that the marked-up price paid by a party to its lawyer (*i.e.* β) is not common knowledge. In practice, it is impossible for the adversary to see the exact value of this parameter since the contract for β is a kind of privileged communication or document between the lawyer and her client.
Overall, a framework based on some of these extensions would certainly provide a more complete and robust analysis of the influence of conditional fees in litigation. Our aim was to develop a theoretical basis to understand this role under idealized conditions, as a prerequisite to analyze it in a more integrative process.

4. Appendix

4.1. Proof of lemma 2 Under the standard rule, the expected utility of a party with value v_i can be written, noting $h_j(e_i)$ the inverse function e_j^{-1}, is

$$\int_{h_j(e_i)}^{1} \frac{1}{2}((x-1)(\beta e_i + e_i - v_i) - 2k)\, dF(v_j) + \int_0^{h_j(e_i)} -\frac{1}{2}(2k + (x+1)(\beta e_i + e_i - v_i))\, dF(v_j)$$

The party determines the optimal expenditures strategy, solving the following first order condition

$$\frac{x(v_i - (\beta+1)e(v_i))F'(v_i)}{e'(v_i)} - \frac{1}{2}(\beta+1)(2xF(v_i) - x + 1) = 0$$

, considering symmetric equilibrium and taking boundary condition $e_i(0) = 0$. Using standard manipulation, we obtain:

$$e^*_{cf}(v_i) = \frac{2x\int_0^{v_i} sF'(s)\, ds}{(\beta+1)(2xF(v_i) - x + 1)}$$

Let $P(v_i)$ denotes the probability that a party with value v_i wins the case,

$$P(v_i) = \left(1 - \frac{x+1}{2}\right)(1 - F(v_i)) + \frac{1}{2}(x+1)F(v_i),$$

we have: $1/P(v_i) = \frac{2}{2xF(v_i)-x+1}$, and hence:

$$e^*_{cf}(v_i) = \frac{x\int_0^{v_i} sF'(s)\, ds}{(1+\beta)P(v_i)}$$

Q.E.D.

4.2. Proof of lemma 1 Under the standard rule with hourly fees, the expected utility of a party with value v_i is:

$$EU(v_i) = \int_{h_j(e_i)}^{1} \left(\left(1 - \frac{x+1}{2}\right)(v_i - (k+e_i)) - \frac{1}{2}(x+1)(k+e_i) \right) dF(v_j)$$

$$+ \int_0^{h_j(e_i)} \left(\frac{1}{2}(x+1)(v_i - (k+e_i)) - \left(1 - \frac{x+1}{2}\right)(k+e_i) \right) dF(v_j)$$

The first order condition of the optimization problem is so given by:

$$\frac{v_i x F'(v_i)}{e'(v_i)} = 1$$

With boundary condition $e_{hf}(0) = 0$, we obtain

$$e^*_{hf}(v_i) = x \int_0^{v_i} sF'(s)\, ds$$

Q.E.D.

4.3. Proof of corollary 1 Under standard rules, and hourly fees, the party pays the attorney regardless of the outcome of the trial. Therefore, the expected payment of the parties can be written as:

$$EP_{hf} = 2\left(k + x\int_0^1 \left(\int_0^{v_i} sF'(s)\, ds\right) dF(v_i)\right)$$

while under standard rules and conditional fees, the party pays the attorney only if winning the case, but in this case, the bonus applies:

$$EP_{cf} = 2\int_0^1 \int_0^{v_i} \frac{\left(2kxF(v_i) - kx + k + x(x+1)\int_0^{v_i} sF'(s)\, ds\right)}{2xF(v_i) - x + 1} dF(v_j)$$

$$+ \left(\int_{v_i}^1 \frac{F'(v_j)(2kxF(v_i) - (x-1)(k + x\int_0^{v_i} sF'(s)\, ds))}{2xF(v_i) - x + 1} dv_j \right) dF(v_i)$$

which can be rewritten as

$$EP_{cf} = 2\left(k + x\int_0^1 \left(\int_0^{v_i} sF'(s)\, ds\right) dF(v_i)\right) = EP_{hf}$$

Q.E.D.

4.4. Proof of proposition 1 Under standard rule and conditional fees, the expected expenditures can be written as:

$$EE_{cf} = \int_0^1 \frac{4xF'(v_i)\left(\int_0^{v_i} sF'(s)\,ds\right)}{(\beta+1)(2xF(v_i)-x+1)}\,dv_i = \frac{2x}{1+\beta}\int_0^1 \frac{\left(\int_0^{v_i} sF'(s)\,ds\right)}{P(v_i)}\,dF(v_i)$$

while under hourly fees, we obtain:

$$EE_{hf} = \int_0^1 2xF'(v_i)\left(\int_0^{v_i} sF'(s)\,ds\right)dv_i$$

Therefore, the difference between expected expenditures can be rewritten as:

$$EE_{hf} - EE_{cf} = 2x\int_0^1 \left(1 - \frac{1}{(1+\beta)P(v_i)}\right)\left(\int_0^{v_i} sF'(s)\,ds\right)dF(v_i)$$

Q.E.D.

4.5. Proof of lemma 3 Under British rules and conditional fees, the party maximizes the following expected utility:

$$EU_{cf} = \int_{h_j(e_i)}^1 F'(v_j)\left(\left(1-\frac{x+1}{2}\right)(v_i-(k+\beta e_i)) - \frac{1}{2}(x+1)(k+e_j(v_j))\right)dv_j$$
$$+\int_0^{h_j(e_i)} F'(v_j)\left(\frac{1}{2}(x+1)(v_i-(c+\beta e_i)) - \left(1-\frac{x+1}{2}\right)(k+e_j(v_j))\right)dv_j$$

It gives us the following first order condition:

$$\frac{x(-\beta e(v_i)+e(v_i)+v_i)F'(v_i)}{e'(v_i)} + \frac{1}{2}\beta(-2xF(v_i)+x-1) = 0$$

which with boundary condition $e(0) = 0$ enable us to derive the following equilibrium strategy:

$$e^*_{cf}(v_i) = \frac{(2x)\int_0^{v_i} sF'(s)(2xF(s)-x+1)^{-1/\beta}\,ds}{(\beta(2xF(v_i)-x+1))(2xF(v_i)-x+1)^{-1/\beta}}$$

Q.E.D.

4.6. Proof of lemma 4 Under British rules and hourly fees, the party maximizes the following expected utility:

$$EU_{hf} = \int_{h_j(e_i)}^1 F'(v_j)\left(\left(1-\frac{x+1}{2}\right)(v_i-k) - \frac{1}{2}(x+1)(k+e_i+e_j(v_j))\right)dv_j$$
$$+\int_0^{h_j(e_i)} F'(v_j)\left(\frac{1}{2}(x+1)(v_i-k) - \left(1-\frac{x+1}{2}\right)(k+e_i+e_j(v_j))\right)dv_j$$

It gives us the following first order condition:

$$\frac{x(2e(v_i)+v_i)F'(v_i)}{e'(v_i)} + xF(v_i) - \frac{x}{2} - \frac{1}{2}$$

which with boundary condition $e(0) = 0$ enable us to derive the following equilibrium strategy:

$$e^*_{hf}(v_i) = \frac{2x\int_0^{v_i} s(-2xF(s)+x+1)F'(s)\,ds}{(-2xF(v_i)+x+1)^2}$$

the probability of losing for a party with value v_i is given by:

$$Q(v_i) = \frac{1}{2}(x+1)(1-F(v_i)) + \left(1-\frac{x+1}{2}\right)F(v_i) = \frac{1}{2}(-2xF(v_i)+x+1)$$

Hence:

$$e^*_{hf}(v_i) = \frac{x}{Q(v_i)^2}\int_0^{v_i} sQ(s)\,dF(s)$$

Q.E.D.

4.7. Proof of proposition [to be completed] 2

$$EE_{cf} = \int_0^1 \frac{4xF'(v_i)(2xF(v_i)-x+1)^{\frac{1}{\beta}-1}\left(\int_0^{v_i} sF'(s)(2xF(s)-x+1)^{-1/\beta}\,ds\right)}{\beta}\,dv_i$$

$$EE_{hf} = 2x\int_0^1 \frac{\left(\int_0^{v_i} s(-2xF(s)+x+1)\,dF(s)\right)}{Q(v_i)(-2xF(v_i)+x+1)}\,dF(v_i)$$

$$EE_{hf}-EE_{cf} = -\frac{-2\beta^2-2((\beta-4)\beta+2)x^2+2\beta^2(x+1)^{1/\beta}(1-x)^{2-\frac{1}{\beta}}+4(\beta-1)\beta x}{4(\beta-1)(2\beta-1)x^2} - \frac{2x}{3(x-1)}$$

4.8. Proof of proposition 3 Under standard rules, the expected utility of a party entering the trial is given by:

$$\int_{\tilde{v}}^{h_j(e_i)} \left(\frac{1}{2}(x+1)(v_i-(k+(\beta+1)e_i)) - k\left(1-\frac{x+1}{2}\right)\right)dF(v_j)$$
$$+\int_{h_j(e_i)}^{1} \left(\left(1-\frac{x+1}{2}\right)(v_i-(k+(\beta+1)e_i)) - \frac{1}{2}k(x+1)\right)dF(v_j).$$

Proceeding as in the previous section, we can determine the strategic expenditure of a party with signal v_i:

$$e^{ee*}_{cf}(v_i) = \frac{v_i^2x-\tilde{v}^2x}{(\beta+1)(2v_ix+\tilde{v}(-x)-\tilde{v}-x+1)},$$

so that, at equilibrium, the expected utility becomes:

$$EU_{cf}^{ee*} = \frac{1}{2}\left(-2k + \frac{x\left(-v_i^2 + v_i\tilde{v} + v_i - \tilde{v}^2\right)}{\tilde{v}-1} + v_i\right).$$

The threshold $\tilde{v}_{cf}$ is determined such that

$$EU_{cf}^{ee*}(\tilde{v})(1-F(\tilde{v})) + \tilde{v}F(\tilde{v}) = \frac{1}{2}\tilde{v}F(\tilde{v}),$$

that is:

$$\tilde{v}_{cf} = \frac{\sqrt{(-2k+x-1)^2 + 8kx} - 2k + x - 1}{2x}$$

In hourly fees, the first order condition determining the optimal expenditures strategy is given by:

$$-\frac{v_i x}{(\tilde{v}-1)e'(v_i)} = 1$$

that enables us to determine the strategy:

$$e_{hf}^{ee*}(v_i) = \frac{\tilde{v}^2 x - v_i^2 x}{2(\tilde{v}-1)}$$

so that, at equilibrium, the expected utility becomes:

$$EU_{hf}^{ee*} = \frac{(1-v_i)\left((1-x)\left(-k + \frac{x(v_i-\tilde{v})(v_i+\tilde{v})}{(\beta+1)(-2v_i x+\tilde{v}x+\tilde{v}+x-1)} + v_i\right) - (x+1)\left(k + \frac{x\left(\tilde{v}^2-v_i^2\right)}{2(\tilde{v}-1)}\right)\right)}{2(1-\tilde{v})}$$

$$+\frac{\frac{(v_i-\tilde{v})\left(-2k(\tilde{v}-1)+v_i^2 x+v_i(\tilde{v}-1)(x+1)-\tilde{v}^2 x\right)}{\tilde{v}-1}}{2(1-\tilde{v})}$$

The threshold $\tilde{v}_{hf}$ is determined such that

$$EU_{hf}^{ee*}(\tilde{v})(1-F(\tilde{v})) + \tilde{v}F(\tilde{v}) = \frac{1}{2}\tilde{v}F(\tilde{v}),$$

that is:

$$\tilde{v}_{hf} = \frac{\sqrt{(-2k+x-1)^2 + 8kx} - 2k + x - 1}{2x} = \tilde{v}_{cf}$$

Q.E.D.

4.9. Proof of proposition 4 Under British rule and considering $x = 1$, the equilibrium expenditures strategies are respectively given by:

$$e^*_{cf}(v_i) = \frac{2^{1/\beta} F(v_i)^{\frac{1}{\beta}-1} \int_0^{v_i} 2^{-1/\beta} s F(s)^{-1/\beta} F'(s)\, ds}{\beta}$$

$$e^*_{hf}(v_i) = \frac{\int_0^{v_i} -2s(F(s)-1)F'(s)\, ds}{2(F(v_i)-1)^2}$$

The strategies are increasing w.r.t. v_i and $\forall \beta \in [0,1]$,

$$\lim_{x \to 1} e^*_{cf}(1) \in [0, \infty[$$

while

$$\lim_{x \to 1} e^*_{hf}(1) = \infty.$$

Hence,

$$\forall v_i \in [0,1], \lim_{x \to 1} EU^*_{cf}(v_i) \in [0, \infty[$$

while

$$\forall v_i \in [0,1], \lim_{x \to 1} EU^*_{cf}(v_i) = \infty.$$

The threshold $\tilde{v}_{cf}$ [resp. $\tilde{v}_{hf}$] being determined by

$$EU^*_{hf}(\tilde{v})(1 - F(\tilde{v})) + \tilde{v}F(\tilde{v}) = \frac{1}{2}\tilde{v}F(\tilde{v}),$$

$$EU^*_{cf}(\tilde{v})(1 - F(\tilde{v})) + \tilde{v}F(\tilde{v}) = \frac{1}{2}\tilde{v}F(\tilde{v}),$$

$$\lim_{x \to 1} \tilde{v}_{hf} = 0$$

while

$$\lim_{x \to 1} \tilde{v}_{cf} \in]0, 1[.$$

Q.E.D.

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