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# Legal Fees, Cost-Shifting Rules and Litigation: Experimental Evidence\*

Yannick Gabuthy<sup>†</sup> Emmanuel Peterle<sup>‡</sup> Jean-Christian Tisserand<sup>§</sup>

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## Abstract

In this paper, we conduct an experiment in order to explore how the legal fee arrangement (i.e. flat or contingent fees) and the trial costs allocation rule (i.e. American or English rule) may shape the efficiency of the litigation process, via their effect on the lawyer's effort, the deterrence of frivolous lawsuits and the plaintiff's incentives to go to court. In our experimental context, it is shown that the combination of contingent fees and English rule is the best setting in terms of effort incentives, but enhances frivolous lawsuits. This result may indicate potentially that the recent tendency observed in European countries to combine contingency and English rule would be desirable only if it is associated to mechanisms discouraging plaintiffs to sue meritless cases.

**Keywords:** Litigation, Fee-shifting rules, Fee arrangements, Experiments.

**JEL codes:** C91, K41.

“Litigation does not present a single externality that might be corrected with a single policy tool. It presents a complex bundle of positive and negative externalities whose correction requires an array of policy instruments.” AVERY W. KATZ AND CHRIS W. SANCHIRICO, *Fee Shifting in Litigation: Survey and Assessment*, 2011.

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## 1. INTRODUCTION

In civil lawsuits, compensation schemes in which the lawyer receives contingent fees are a typical feature of the U.S. judicial system. Indeed, 92%-98% of individual plaintiffs and 85%-88% of corporate plaintiffs retain their attorney on this basis in American tort and contract litigation cases (Emons and Fluet, 2016). Under this payment schedule, the attorney gets a share of the judgement if her client wins and nothing if he loses.<sup>1</sup> In Europe, such “no win - no fee” agreements were regarded as an unacceptable conflict of interest to the lawyer and, hence, strictly forbidden for a long time (*pactum de quota litis* was not allowed by the ethical code of the European Association of Lawyers). However, this picture is actually moving since contingent fees are becoming increasingly popular in European countries. For example, in Germany, some restrictions were removed in the law adopted in 2008 in order to enable the use of contingent remunerations (Baumann and Friehe, 2012). In the same way, France has relaxed certain constraints by introducing the possibility of such mechanisms in some cases, but not to the extreme of accepting explicit contingent fees (Kritzer, 2004; Emons, 2008). In these countries, contingent fees will often be used in conjunction with the English – fee-shifting – rule, which states that the losing party bears the winner’s litigation cost.<sup>2</sup> Indeed, as emphasized by Bungard (2006), this loser-pays rule is a widely applied principle in European systems and is expressed in many codes of civil procedure.<sup>3</sup> As a result, it is a relevant policy question of whether the coexistence of contingent fees and fee-shifting rule may be harmonized.

Following this issue, we conduct an experiment in order to explore how the legal fee arrangement (i.e. flat or contingent fees) and the trial costs allocation rule (i.e. American or English rule) may shape the efficiency of the litigation process. In this context, our experimental setting entails four different legal regimes which are compared on the basis of three criteria: the lawyer’s effort incentives to defend the case, the deterrence of frivolous lawsuits, and the access to justice (which is captured by the ability of legal regime to promote meritorious claims).<sup>4</sup> These

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<sup>1</sup>We use the pronoun “she” to refer to the lawyer and “he” to refer to the client.

<sup>2</sup>In contrast, the so-called American rule stipulates that each disputant incurs his own cost.

<sup>3</sup>See, for example, §41 of the Austrian code, §1 of the Swedish code, article 1017 of the Belgian code or article 91 of the Italian code.

<sup>4</sup>The concept of frivolous suit is quite slippery since several definitions can be given to frivolousness

criteria are obviously not all-encompassing when one wishes to assess the efficiency of the litigation process, however they seem to match up with some important objectives pursued when introducing contingent fees and English rule. Indeed, the use of contingent fees is usually viewed in theoretical literature as a way to improve the lawyer-client relationship by providing more effort incentives to the lawyer: tying the attorney's payment on the outcome of litigation would mitigate the moral hazard problem and, hence, reduce shirking which is magnified under flat fees (see, e.g., Danzon, 1983; Halpern and Turnbull, 1983; Hay, 1996; Wang, 2008).<sup>5</sup> In the same way, it is usually argued in the literature that the English rule should deter frivolous claims by diluting the value of low-probability-of-prevailing cases and enhances the value of high-probability-of-prevailing cases (Carbonara *et al.*, 2015).<sup>6</sup> This question of whether meritless lawsuits may be discouraged by fee-shifting is important, since frivolous litigation is frequently cited by policymakers and scholars as a major cause of the civil judicial system's most serious ills (e.g. waste of resources, caseloads of public courts, occurrence of unjustified wealth transfers). For instance, in a reported survey of American jurors in cases in which businesses or corporations were defendants, 83% of the jurors indicated that they "agree" with the statement that there are far too many frivolous suits today (Polinsky and Rubinfeld, 1993).<sup>7</sup> These concerns explain why the issue of frivolous litigation has inspired some significant procedural developments in western countries over the last decades. For example, the Private Securities Litigation Reform Act which was entertained by the American Congress in 1995 contains many provisions designed to reduce meritless class actions (Choi, 2007). More recently, within the debate over health reform, a number of influential commentators and policymakers have recommended adopting the English loser pays rule in the U.S. as a way to curb medical malpractice costs (Katz and

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(see Bone, 1997, for a taxonomy). In our paper, we choose one of these definitions – which is also used by Coughlan and Plott (1997) in their experiment – by considering a claim as meritless whenever the probability of success at trial is very small (i.e. below a given threshold).

<sup>5</sup>Contingent fees may obviously have other virtues, in terms of risk-sharing and access to justice (when plaintiffs are liquidity constrained and capital markets are imperfect). This virtues might be tackled in further experiments, although the risk-sharing issue is partially addressed in our experiment since we elicit the participants' risk preferences.

<sup>6</sup>Note that the use of this rule has also been justified on grounds of fairness. Indeed, it seems relevant to transfer the costs expended in litigation from the loser to the winner if the desired consequence of litigation is to make the winning party whole (Kritzer, 2002).

<sup>7</sup>As mentioned by Bone (1997), we can only rely upon such reports of widely-shared experience in practice communities, given the difficulty to measure frivolous suits and, thus, to apply rigorous empirical methods.

Sanchirico, 2011).

Following this feature, we establish the following experimental findings. The observed behaviours emphasize that the introduction of contingent fees – under a given cost-allocation rule – tends to enhance the lawyers’ levels of effort, depending on the value of the plaintiffs’ damage and the amount of the fees. This result follows the theoretical insights mentioned above and is consistent with the idea that contingent fees may be viewed as a way to alleviate the moral hazard problem. However, the results highlight also that this problem is softer than predicted under flat fees because some reciprocity considerations and/or intrinsic motivations seem to enhance efforts above the equilibrium value.<sup>8</sup> Furthermore, more surprisingly, the attorneys’ efforts seem to be also altered by the trial cost-allocation rule in place, whereas the introduction of fee-shifting does not modify the lawyer’s payoff function. In this context, our experiment displays that the levels of effort are highest in the legal regime mixing English rule and contingent fees, which is also the combination in which plaintiffs express the strongest willingness to sue. We observe, however, that this combination encourages plaintiffs to file frivolous lawsuits. Overall, it seems that the introduction of contingent fees in a legal system applying the English rule has a desirable effect by lessening the moral hazard problem, but induces also a perverse effect by ruling out an important virtue of fee-shifting, which is its ability to deter meritless lawsuits. Following experimental behaviours, this phenomenon may be explained as follows. Anticipating that his lawyer’s performance will be boosted by contingency, a given client is encouraged to go to court even when his case lacks of merit, which works against the prior deterrent effect mentioned above.<sup>9</sup>

In this regard, the main contribution of the present study is twofold. First, while our insights are highlighted obviously in a very specific experimental context, we think they may contribute in some extent to the – mentioned above – policy debate growing in some European countries over the opportunity to follow the U.S. tendency, and then to allow the use of pay-for-performance contracts between litigants

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<sup>8</sup>Fehr and Gächter (2000) provide an overview of the considerable evidence for reciprocity/fairness-based behaviours arising in different economic and social contexts (public good games, labour market interactions, ...).

<sup>9</sup>This result is obtained by assuming that the client has the control over the decision to go to trial, given that the lawyer’s participation constraint is always satisfied. The issue of actual power sharing between plaintiff and his attorney – over the litigation process – is broadly discussed in the literature (see e.g. Miller, 1987; Bebchuk, 1988; Hay, 1997; Choi, 2003; Hyde, 2006), and our approach could then be extended by consider an alternative decision-making allocation. See the conclusion of our paper for a discussion about this issue.

and their lawyers. Given that the English rule applies in these countries, our experimental results lead us to think that this switchover from flat to contingent fees is not necessarily desirable, implying a trade-off between the effort incentives provided to lawyers and the inflating impact on frivolous lawsuits. In this context, we argue that this trend toward the adoption of no win - no fee agreements in Europe should be associated to policy instruments aiming to deter meritless claims (e.g. strict pleading, penalties, ...).<sup>10</sup> Second, we believe that our analysis may also contribute to the discussion existing in experimental literature over the respective merits of the English and American rules. Overall, this literature highlights that legal fee-shifting may influence a variety of decisions along the litigation flow, including the decision to initiate a lawsuit, the choice between the settlement and trial, and the incentives to expend resources in the case. In this respect, Coursey and Stanley (1988) find out that the English rule produces significantly more pre-trial settlements than the American rule, since the higher risk of bearing the opponent's cost under fee-shifting leads risk-averse litigants to settle. Furthermore, it is shown that parties with weaker cases earn less under the English rule than under the American rule, suggesting that fee-shifting has indeed a deterrent effect on meritless claims. Main and Park (2000) go further by studying the impact of fee-shifting on the *value* of pre-trial settlements. They emphasize that the English rule produces higher (i.e. pro-plaintiff) settlements if the plaintiff's winning probability is large, which is due to the fact that the defendant has more to lose (and the pursuer more to gain) under fee-shifting than under the American rule. Coughlan and Plott (1997) extend the experiment by Coursey and Stanley (1988) by allowing participants to choose their levels of legal expenditures, and show that the English rule encourages greater expenses.<sup>11</sup> The reasons are twofold: first, fee-shifting increases the stakes of the litigated case by making expenditures part of the potential damages and, second, it lowers the expected individual marginal cost of legal expenditure, since each disputant will discount his cost by the probability with which he expects to win. Dechenaux and

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<sup>10</sup>The standard pleading in some legal regimes is "notice pleading" which requires very little factual detail. In this context, proponents of "strict pleading" argue that a plaintiff who is required to allege specific facts will be discouraged from bringing nuisance suits. With the same objective, Rule 11 of the Federal Rules of Civil Procedure in the U.S. implies penalties on individuals who present an evidence which is deemed to be frivolous. Overall, see Bone (1997) for more details on these policy instruments.

<sup>11</sup>Moreover, this result is consistent with the empirical findings by Hughes and Snyder (1995) who use field data from Florida which applied the English rule for medical malpractice claims from 1980 to 1985.

Mancini (2008) confirm that this finding is robust to a varying context of interaction since the authors highlight that the English rule generates more spending, and hence less incentives to litigate, in an experimental context where litigation is designed as an auction. As stated by Massenet *et al.* (2021), this influence of fee-shifting on legal expenditures may have an indirect positive effect by encouraging defendant to take care *ex-ante*, in order to lessen the probability that an accident – and hence a lawsuit – occurs. While this literature provided insightful results, it also suffers from a significant weakness by overlooking the potential implications of the fee arrangement in place, while we know that fee schedules are different between current judicial systems.<sup>12</sup> In this regard, we believe our experiment fills this gap by showing that the performance of costs allocation rules may indeed be critically dependent on the existing schedule.

The remainder of the paper is organized as follows. Section 2 describes our experimental design. Section 3 analyses our results and discusses the subjects' observed behaviour. Section 4 concludes and proposes some extensions.

## 2. EXPERIMENTAL DESIGN AND THEORETICAL PREDICTIONS

In this section, we provide a general description of the experimental design, expose some theoretical predictions of the game, and finally explain experimental procedure.

**2.1. Experimental design.** In all the experimental conditions described below, subjects participated either as a plaintiff (player A) or as a lawyer (player B), and were randomly assigned to an eight-person experimental legal market comprising four plaintiffs and four attorneys. Role assignment and groups composition remained the same throughout the entire session.

A session was divided into three *steps*. In the first step, participants in the role of plaintiffs take part in a real-effort task. The plaintiff's performance in the task determines his initial endowment. The second step is a repeated litigation game in which each plaintiff incurs an exogenous loss/damage and may hire an attorney

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<sup>12</sup>To the best of our knowledge, the paper by McKee *et al.* (2007) is the only experiment analyzing how contingent fees may shape the lawyer's incentives to defend the case in a context of asymmetric information. Implementing an experimental market, the authors highlight that the lawyers' efforts are effectively increasing with contingency and that clients are sophisticated enough to understand this relationship between contingent fees and efforts. However, their analysis ignores the issue of fee-shifting.

to attempt to get a full monetary compensation (from a computerized defendant). Finally, the third step is a standard lottery choice, based on Eckel and Grossman (2008), which provides us with an individual measurement of risk attitude. Let us elaborate.

The first step consists in a real-effort task, performed by each plaintiff, for four minutes. We use a decoding task, inspired by Charness *et al.* (2013), where participants have to decode sets of one-digit numbers into letters from a grid of letters displayed on the screen. Participants earned 20 ECU (Experimental Currency Unit) for each correctly solved task. We introduce this preliminary task in order to implement a feeling of entitlement among plaintiffs by making them generating their own endowment, which deeply contrasts with previous experimental papers on litigation where endowments are exogenously given. This choice is made over the use of windfall money so that plaintiffs would be effectively affected by losses in the second step of the experiment. Indeed, several experimental studies highlight that windfall money virtually increases the risk taken by subjects (see, e.g., Ackert *et al.*, 2006). Nevertheless, we set an upper limit of 400 ECU to earnings in this first step, in order to avoid heterogeneity in endowments and to ensure that most participants could reach the maximum possible value.<sup>13</sup>

The second step entails a litigation game which is repeated over twenty *periods*, each period representing a legal case. At the beginning of a given period, plaintiffs face a potential exogenous loss/damage  $D = \{100, 200, 300\}$ , whose amount is determined randomly with a one-third probability for each possible value. This loss is withdrawn from the endowment earned by the plaintiff in the previous real-effort task. However, the plaintiff can decide to hire an attorney – which is endowed with 100 ECU – in order to be fully compensated for this damage.<sup>14</sup> The probability of recovering the loss for the plaintiff depends both on the inherent *merit* of the case,  $\pi$ , and on the *effort*,  $e$ , undertaken by his lawyer. This probability is then given by the following

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<sup>13</sup>In the seminal paper by Charness *et al.* (2013), average performance in a two-minute lapse was over 25 tasks. In our experiment, all participants but one managed to perform at least 20 tasks and thus reached the upper limit of 400 ECU.

<sup>14</sup>Note that a lawyer can be hired by more than one plaintiff in a given period of the litigation game. Furthermore, lawyers cannot be identified by plaintiffs through any kind of identification mark. Consequently, we will consider periods as a sequence of one-shot games, in which lawyers are not exposed to any reputation concern.



specific functional form (which is due to Coughlan and Plott, 1997):

$$g(e) = \alpha \frac{e}{e + e_D} + (1 - \alpha)\pi, \quad (1)$$

where  $e_D$  is the defendant’s effort (which is a fixed parameter), while  $\alpha \in [0, 1]$  weights the relative importance of the plaintiff’s lawyer effort versus merit in determining the outcome. This parameter may capture the productivity of the lawyer.<sup>15</sup> Furthermore, we consider an effort cost function for the plaintiff’s attorney which is given by:

$$c(e) = (e - 1)^2, \quad (2)$$

implying that  $c(\cdot)$  is convex, strictly increasing and twice continuously differentiable. Overall, Table 1 describes the different possible values for both  $g(\cdot)$  and  $c(\cdot)$  given the parameters chosen in the experiment (i.e.  $\alpha = 0.5$ ,  $e_D = 5$ ,  $e \in \{1, \dots, 10\}$  and  $\pi \in \{0, 0.25, 0.50, 0.75, 1\}$ ).

Table 1: Probability of recovering the loss

Effort	$\pi = 0$	$\pi = 0.25$	$\pi = 0.50$	$\pi = 0.75$	$\pi = 1$	Cost of effort
1	8.33%	20.83%	33.33%	45.83%	58.33%	0
2	14.29%	26.79%	39.29%	51.79%	64.29%	1
3	18.75%	31.25%	43.75%	56.25%	68.75%	4
4	22.22%	34.72%	47.22%	59.72%	72.22%	9
5	25.00%	37.50%	50.00%	62.50%	75.00%	16
6	27.27%	39.77%	52.27%	64.77%	77.27%	25
7	29.17%	41.67%	54.17%	66.67%	79.17%	36
8	30.77%	43.27%	55.77%	68.27%	80.77%	49
9	32.14%	44.64%	57.14%	69.64%	82.14%	64
10	33.33%	45.83%	58.33%	70.83%	83.33%	81

In all treatments, which are described below, participants face the same set of twenty damage-merit combinations. We constructed this specific set of cases so that periods six to twenty consist in an orthogonal design: the fifteen possible combinations of loss and merit appear in these last fifteen rounds. Therefore, the twenty periods can be divided into two parts. The first five periods, although compensated, can be

<sup>15</sup>This function, which is additive in  $e$  and  $\pi$ , has been deliberately chosen to implement a game-theoretic environment as simple as possible for the subjects. However, more complex – and realistic – forms could have been considered to represent the so-called “litigation success function” (see, e.g., Katz, 1988), an alternative that is proposed as an extension in the conclusion of our paper.

considered as practice periods in the analysis, as participants face the different case parameters (merit and loss) for the first time in those five periods. The fifteen last periods constitute our orthogonal design. We chose to remove the first five periods of the litigation game from the empirical analysis in order to dismiss potential learning effects which could arise at the beginning of the experiment. Furthermore, to control for “order effect”, we reversed the order in which cases appear between odd and even sessions. The sequence of damage-merit combinations across periods is reported in Table A1 (see appendix A).

Following the arguments exposed in the introduction, the aim of our study is to analyze how the litigation process may be affected by both legal fee arrangement and trial costs allocation rule. Therefore, our experiment is based on a factorial  $2 \times 2$  design combining two lawyer compensation structures (i.e. flat or contingent fees) and two fees sharing rules (i.e. American or English rule). In treatments with flat fees, the lawyer can request a fixed remuneration  $f \in \{50, \dots, 150\}$  from the plaintiffs, and gets this payment – if she is hired – regardless of the litigation outcome (i.e. even if she fails to obtain recovery for her client in litigation). The different values for  $f$  are expressed in increments of ten ECU. In treatments with contingent fees, the lawyer gets a fixed payment of 50 ECU and may request a share  $\beta \in \{0, \dots, 1\}$  of the recovered amount  $D$ , that she will receive only in case of winning. The different values for  $\beta$  are expressed in increments of 0.1. Overall, the lawyer’s payoff,  $\Pi_L$ , is defined as follows under contingent fees:

$$\Pi_L = \begin{cases} 50 + \beta D & \text{if the case is won,} \\ 50 & \text{otherwise.} \end{cases}$$

A lump sum of 50 ECU is included in the contingent fee contract to ensure that the minimum fee level for selected attorneys is the same across treatments. Furthermore, this way to formalize contingency is common in theoretical literature (see, e.g., Emons and Garoupa, 2006). Given our  $2 \times 2$  design, we consider also two different trial costs allocation rules. The English (fee-shifting) rule is then implemented – within treatments with flat and contingent fees – by considering that an amount of 50 ECU is transferred to the plaintiff (resp. defendant) if his lawyer wins (resp. loses).<sup>16</sup> In other words, we assume that a – shiftable – amount of 50 ECU is included

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<sup>16</sup>Recall that defendants are computerized in our experimental setting. We thus consider the

both in the flat fees (since  $f \geq 50$ ) and in the contingent fees (since the lawyer gets either 50 or  $50 + \beta D$  ECU under this payment schedule). This way to implement cost-shifting is based on practice. Indeed, the majority of jurisdictions using the English rule introduce a limitation on fee-shifting – based on the reasonableness and proportionality of legal expenditures – and do not allow the winning party to recover the contingent share of the fees from her opponent (see, e.g., Hyde and Williams, 2002; Hyde, 2006). Overall, noting  $\Pi_P^i$  (resp.  $\Pi_L^i$ ) the payoff function of the plaintiff (resp. lawyer) in treatment  $i$ , we get the following payoff functions for the participants depending on the treatment which is considered.

- Flat fees/American rule (FA treatment):

$$\Pi_P^{FA} = \begin{cases} 400 - f, & \text{if the case is won;} \\ 400 - D - f, & \text{otherwise.} \end{cases}$$

$$\Pi_L^{FA} = 100 + f - c(e), \text{ regardless of the litigation outcome.}$$

- Flat fees/English rule (FE treatment):

$$\Pi_P^{FE} = \begin{cases} 400 - f + 50, & \text{if the case is won;} \\ 400 - D - f - 50, & \text{otherwise.} \end{cases}$$

$$\Pi_L^{FE} = \Pi_L^{FA}.$$

- Contingent fees/American rule (CA treatment):

$$\Pi_P^{CA} = \begin{cases} 400 - \beta D - 50, & \text{if the case is won;} \\ 400 - D - 50, & \text{otherwise.} \end{cases}$$

$$\Pi_L^{CA} = \begin{cases} 100 + 50 + \beta D - c(e), & \text{if the case is won;} \\ 100 + 50 - c(e), & \text{otherwise.} \end{cases}$$

- Contingent fees/English rule (CE treatment):

$$\Pi_P^{CE} = \begin{cases} 400 - \beta D, & \text{if the case is won;} \\ 400 - D - 100, & \text{otherwise.} \end{cases}$$

$$\Pi_L^{CE} = \Pi_L^{CA}.$$

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experimenter as the defendant in the litigation process.

Finally, in the last step of the session, we measure the subjects' risk preferences – as control variable – by applying the lottery-choice task due to Eckel and Grossman (2008). Six gambles are exposed to participants, who have to choose one of them, given that every lottery generates two possible outcomes (i.e. a low or a high payoff) with a 0.5 probability to occur. Table 2 reports an overview of the gambles, their expected payoffs, and the corresponding Constant Relative Risk Aversion (CRRA) parameters. The outcome of this step is determined at the end of the experiment, and the corresponding payoff is added to the participant's final gain.

Table 2: Elicitation of risk attitude

Choice	High Payoff (€)	Low Payoff (€)	Exp. payoff	Implied CRRA Range
1	5.60	5.60	5.60	$3.46 < r$
2	7.20	4.80	6.00	$1.16 < r < 3.45$
3	8.80	4.00	6.40	$0.71 < r < 1.16$
4	10.40	3.20	6.80	$0.50 < r < 0.71$
5	12.00	2.40	7.20	$0 < r < 0.50$
6	14.00	0.40	7.20	$r < 0$

Given the different treatments, steps of the experiment and corresponding parameters, we now turn to the formulation of some theoretical predictions serving as a background for the empirical analysis.

**2.2. Theoretical predictions.** The repeated litigation process implemented in the experiment – as the second step of each session – is a three-*stage* game, whose timing is as follows.

At the first stage, without knowing the future legal cases they will potentially have to defend, the four lawyers declare simultaneously – and non-cooperatively – the fees they wish to get whenever they are selected by a plaintiff. In other words, each attorney has to choose, and post on the market, the requested level of  $f$  (resp.  $\beta$ ) in FA/FE (resp. CA/CE) treatments, ignoring both the value of the damage,  $D$ , and the merit of the case,  $\pi$ , for this period.

At the second stage, each of the four plaintiffs learns his drawn value of  $D$  and  $\pi$  (by discovering one column of Table 1 above), observes the posted fees, and then either chooses to hire an attorney or not. If the plaintiff chooses not to employ a lawyer, the suit is dropped and the interaction moves to a new period. If he retains

a lawyer, the litigation game goes to the next stage.<sup>17</sup>

At the third stage, each attorney is informed of whether she has been selected by at least one plaintiff. The lawyer then observes the value of the damage and the merit of the case, and chooses her effort level to defend this case.<sup>18</sup> The different values for both the probability of success at trial and the effort cost are displayed in Table 1<sup>19</sup>. At the end of this stage, the players' payoffs are realized, depending on the current treatment  $i$  (see  $\Pi_j^i$  defined above, with  $i = \{FA, FE, CA, CE\}$  and  $j = \{P, L\}$ ).

With this sequential game in place, we now proceed in the standard “backward-induction” fashion in order to get some predictions on the expected behaviours in the experiment. Then, we first characterize the equilibrium level of effort chosen by the lawyer at the third stage, conditional on an arbitrary set of choices made before. Under flat fees and regardless of the cost-shifting rule in place, the attorney undertakes the minimum effort level (i.e.  $e^i = 1$ , with  $i = \{FA, FE\}$ ), since effort is costly and her payoff is not tied on the outcome of litigation. We get here a particular manifestation of the moral hazard problem, which arises in the same way under the American and the English rules since  $\Pi_L^{FE} = \Pi_L^{FA}$ . Moreover, using the lawyer's payoff functions defined above, simplifying and re-arranging terms, we can show that the equilibrium level of effort under contingent fees,  $e^i$  (with  $i = \{CA, CE\}$ ), is determined by:

$$e^i = \arg \max_e \Pi_L^i = 150 + g(e)\beta D - c(e).$$

Using (1), (2), and assuming continuity in effort, we get the following first-order

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<sup>17</sup>In other words, at the time the fee arrangement is made, the client is assumed to be better informed than the lawyer about the facts of the case and the prospects for recovery (as captured by  $\pi$  and  $D$ ). This feature follows notably the framework by Rubinfeld and Scotchmer (1993) and Miceli (1994).

<sup>18</sup>In the experiment, we allowed an attorney to be selected by several plaintiffs, while a plaintiff was not allowed to hire several lawyers. In the former situation, the lawyer was asked to choose several levels of effort in a random order (given the randomized order in which the clients arrive). However, this situation was not often observed in the experiment (less than 19% of the 1,425 cases of periods 6-20) and is thus neglected in the theoretical analysis.

<sup>19</sup>In the lab, the resolution of the case is implemented in the following way. A random number is drawn from a continuous uniform distribution with support  $[0; 1]$ . If this number is lower than the probability given by both the merit of the case and the effort of the lawyer, the outcome is a success. If not, the outcome is a failure.

condition:

$$g'(e^i)\beta D = c'(e^i) \Leftrightarrow \frac{\alpha e_D}{(e^i + e_D)^2}\beta D = 2(e^i - 1),$$

where  $\alpha = 0.5$  and  $e_D = 5$ . This condition implies obviously that the lawyer's marginal benefit from an increase in  $e$  should be equal to her corresponding marginal cost. However, given that effort choice is discrete in our experiment, this condition cannot be rigorously satisfied within the experimental setting. In this context, considering that the lawyer will choose the highest discrete effort level for which her marginal benefit is higher or equal to her marginal cost, we get the following predictions for the effort values that should be chosen in treatment  $i = \{CA, CE\}$  (depending on  $D$  and  $\beta$ , given that  $\beta$  is also determined endogenously):<sup>20</sup>

Table 3: Predicted effort levels in contingent-fees treatments

	$\beta = 0$	$\beta = 0.1$	$\beta = 0.2$	$\beta = 0.3$	$\beta = 0.4$	$\beta = 0.5$	$\beta = 0.6$	$\beta = 0.7$	$\beta = 0.8$	$\beta = 0.9$	$\beta = 1$
$D = 100$	$e^i = 1$	1	1	1	2	2	2	2	2	2	2
$D = 200$	1	1	2	2	2	2	3	3	3	3	4
$D = 300$	1	1	2	2	3	3	3	4	4	4	4

A first set of predictions follows immediately.

**Prediction 1.** (i) *The lawyer's effort level is higher under contingent fees than under flat fees if and only if  $D = \{200, 300\}$  and  $\beta \geq 0.2$ , but it is not altered by the fee-shifting rule in place within a given fee arrangement;* (ii) *Under contingent fees, the lawyer's effort level is increasing in her payment in case of success at trial,  $\beta D$ , while it does not depend on the merit of the case,  $\pi$ .*

Our second set of predictions will be related to the second stage of the game where the plaintiff has to decide between filing a suit and dropping the case. Using the lawyer's payoff functions defined above, simplifying and re-arranging terms, we can highlight that the plaintiff will choose to go to trial if the following participation constraints are satisfied (depending on the treatment which is considered):

$$\Pi_P^i \geq 400 - D \Leftrightarrow \begin{cases} g(e^{FA})D - f \geq 0 \text{ (in FA treatment),} \\ g(e^{FE})(100 + D) - f - 50 \geq 0 \text{ (in FE treatment),} \\ g(e^{CA})D(1 - \beta) - 50 \geq 0 \text{ (in CA treatment),} \\ g(e^{CE})D(1 - \beta) - (1 - g(e^{CE}))100 \geq 0 \text{ (in CE treatment),} \end{cases}$$

<sup>20</sup>These results are based on simple but tedious calculations, the details of which are not provided here. However, the corresponding computer files are available upon request.

where  $e^i$  is the equilibrium level of effort which will be undertaken by the lawyer at the third stage in treatment  $i$  (knowing that  $e^{FA} = e^{FE}$  and  $e^{CA} = e^{CE}$ ). By interpreting this expression and considering that the plaintiff is more prone to sue when his expected payoff is higher, we obtain the following sets of qualitative predictions (see Appendix B for more analytical considerations):

**Prediction 2.** *(i) Under flat fees, considering that the lawyer's fixed remuneration,  $f$ , is less than a given threshold, the plaintiff's incentives to sue are enhanced when the damage,  $D$ , and the merit of the case,  $\pi$ , increases; (ii) Under contingent fees, the damage and the case merit have also an incentive effect on suing, if  $\beta$  is less than a given threshold.<sup>21</sup>*

**Prediction 3.** *(i) The plaintiff has higher incentives to sue under contingent fees than under flat fees, for a given cost-shifting rule, when both  $D$ ,  $f$ , and the spread between the lawyer's efforts under these two fee arrangements are sufficiently high. The merit of the case,  $\pi$ , does not shape these incentives, while the impact of  $\beta$  is ambiguous; (ii) The plaintiff has higher incentives to sue under the English rule than under the American rule, for a given fee arrangement, if and only if the probability of winning at trial,  $g(\cdot)$ , is higher than  $1/2$ .*

Overall, these predictions are relatively intuitive and consistent with the main purposes behind the implementation of the contingency lawyer's remuneration and the English rule. Indeed, the theoretical results highlight that contingent fees should help to lessen the moral hazard problem, depending on the value of the damage and the magnitude of the contingency rate, which may influence indirectly the client's incentives to go to court. Furthermore, it is shown that the English rule should effectively deter frivolous claims by enhancing the stakes of the litigated case: a screening effect is induced since only cases with a sufficient probability of winning (i.e.  $1/2$ ) should go to court.

We now turn to the first stage of the litigation game. At this stage, the lawyer has to post the flat or contingent fee – depending on the existing regime – she would like to charge, ignoring the damage-merit combination that will take place. Given

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<sup>21</sup>Note that the effect of  $\beta$  on the plaintiff's incentives to sue may be strategically more complex than the influence of  $f$ , because  $\beta$  is not only a cost for the client but may also be a benefit by enhancing the lawyer's effort (depending on  $D$ ), and hence the probability of winning at trial (while  $f$  is only a cost and has no incentive properties).

that the market for legal services is competitive (since four attorneys compete via setting fees), each lawyer is predicted to maximize the client’s surplus, subject to the moral hazard problem and the restriction that she gets non-negative payoffs in equilibrium. Note, however, that the attorney’s participation constraint is always satisfied given the parameters’ values used in the experiment. In this context, we can formulate the following set of predictions.

**Prediction 4.** (i) *The flat fee,  $f$ , posted by the lawyer is set at its lowest possible value; (ii) In contrast, the contingency rate,  $\beta$ , is set at an interior value.*

The intuition behind these predictions is as follows. As shown in prediction 1, the flat fee does not impact the lawyer’s effort in equilibrium and, hence, exerts only a downward pressure on the client’s profit. Therefore, the market forces should drive this value to the point where the lawyer’s expected payoffs are as low as possible. In contrast, the client’s profit-maximizing contingent fee is higher than zero since this pay-for-performance contract mitigates the moral hazard problem, but not too high given the competitive constraint. Note that our prediction cannot be more precise since the lawyer does not observe  $D$  and  $\pi$  at this stage, which makes him unable to anticipate perfectly both the equilibrium value of her effort and the probability of trial, and thus to determine the optimal contingency rate.

Finally, our experimental design enables us to elicit the participants’ risk preferences, by using the Eckel and Grossman (2008)’s method, and some predictions should then be formulated about the role played by risk aversion.

**Prediction 5.** (i) *Risk-aversion has a deterrent effect on the plaintiff’s incentives to go to court, regardless of the treatment, due to the risk associated to the trial process; (ii) This effect is stronger with the English rule, for a given fee arrangement, since the stakes of the case are higher; (iii) In contrast, this effect is weakened under contingent fees, for a given cost-shifting rule, since contingency induces that a share of the risk is shifted from the client to his lawyer.*

We can now explain how the experimental sessions played out in practice.

**2.3. Experimental procedure.** The experiment was computerized using the Z-Tree software package, developed by Fischbacher (2007), and was run in the BETA



experimental laboratory.<sup>22</sup> A total of 192 participants were randomly recruited from a subject pool of undergraduate students in various fields (including law, economics, science, psychology and sport), via the ORSEE software (Greiner, 2015). No student could participate in more than one session, and the experimenters were the same for all the sessions. The experiment includes eight sessions equally distributed between our four treatments (see Table 4 below).

Upon arrival, participants were randomly assigned to visually isolated computers: the BETA experimental laboratory has privacy conditions sufficient to ensure that participants could not observe each others' decisions. At the beginning of each session, written instructions were distributed and read aloud (see Appendix C), before the subjects performed a pre-experimental test to check for understanding. Clarifying questions were asked and answered privately, and the experiment started only after all questions had been correctly answered. At the end of a given period (i.e. a litigation game described above), plaintiffs and lawyers received feedback on their own decisions, the decisions of their partner, and the monetary outcome of the period. At the end of a session, one of the fifteen periods was randomly drawn to determine the participants' payoffs which were privately paid in cash. If more than one relationship occurred in the drawn period for the same attorney (getting several clients), a single relationship was randomly extracted from this period to compute this subject's payment (a rare event; see footnote 18). Earnings were converted based on a conversion rate of 1 euros for 25 ECU, which provided an average payoff of 18.55 euros (including the 5 euros show-up fee). Each experimental session lasted approximately one hour.

Table 4: Experimental sessions

	# of sessions	# of subjects
FA treatment	2	48
FE treatment	2	48
CA treatment	2	48
CE treatment	2	48
Total	8	192

Data from the four sessions corresponding to the FA and the FE treatments have

<sup>22</sup>See "Laboratoire d'Economie Expérimentale de Strasbourg" (LEES): <http://lees.u-strasbg.fr/orsee/public/>.

been used in Gabuthy *et al.* (2020), a companion paper published in French. This preliminary study departs from the current research, as it focuses on the role of the English rule in a European context, where fees are not contingent.

### 3. RESULTS

Our experimental framework involves repeated interactions over twenty periods. Periods six to twenty are of particular interest, as they include exactly the fifteen merit-loss combinations available in our experiment. As mentioned above, we exclude the five first periods from the presented analysis in order to ensure a balance among these combinations, and to minimize the role of mistakes due to participants learning in the early stages of the experiment. This exclusion affects neither the sign, nor the statistical significance of any of the effects we report in this study. However, the analysis including the full sample are available from the authors upon request. All participants in the role of plaintiff except for one have managed to obtain the maximal endowment of 400 ECU; one participant in the CA treatment failed to perform in the preliminary task and obtained an endowment of 40 ECU. This participant could not afford any attorney’s fee and has therefore been excluded from the study.

In the following analysis, we run Wilcoxon Mann-Whitney (henceforth WMW) tests when comparing averages over independent observations, as well as proportion z-tests when comparing percentages. All reported tests are two-tailed. An “experimental market” of four lawyers and four plaintiffs constitutes an independent observation, in the sense that they only interact together, and never outside of the market. We have therefore six independent observations per treatment, and the tests are performed at this level. This choice leads our tests to be quite conservative, but the nonparametric tests we run require to consider only independent observations.

**3.1. Bidding behavior on the lawyer market.** Table 5 reports – for our four treatments – the average bids submitted by attorneys on their respective market. Bids in both flat-fees treatments (i.e. the value of  $f$  in FA and FE) are expressed in ECU, whereas bids in both contingent-fees treatments (i.e. the value of  $\beta$  in CA and CE) are expressed as a share of the loss incurred by the plaintiff. This share is perceived by the attorney only in case of success at trial and is added to a fixed

fee of 50 ECU. Flat and contingent fees are hence vastly different in nature, making the direct comparison of bidding decisions irrelevant.

Attorneys bid an average fee of 83.53 ECU in the FA treatment. Introducing fee-shifting under the flat-fees arrangement does not significantly affect the submitted bids in average (82.89 ECU, WMW test:  $p = 0.9425$ ). In contrast, our data suggest that introducing a fee-shifting mechanism in the contingent-fees arrangement significantly increases attorneys' bids in average. Indeed, the average bid of attorneys is about 35.19% in the CA treatment, and about 49.08% in the CE treatment (WMW test:  $p = 0.0145$ ). Our findings are similar when excluding from our sample the bids that were not accepted, as seen in the third and fourth column of table 5.

Figure 1 reports the average bids submitted by attorneys over periods and across treatments. These graphs confirm our previous finding: the English rule has a clear effect on bidding behaviors in the contingent-fees treatments. There is no clear treatment effect however in the flat-fees treatments.<sup>23</sup> Bidding decisions also appear more stable in contingent-fees treatments compared to flat-fees treatments. This may be due to contingent fees being expressed as a percentage of the loss, which prevents attorneys to adjust their fees according to the potential loss they expect in the period.<sup>24</sup>

Despite competition on the legal market, bids in the flat-fees treatments are far above their minimal level of 50 ECU (t-test,  $p < 0.001$ ). This result contrasts with prediction 4. It is however consistent with previous experimental findings (see e.g. Fehr *et al.*, 1998) which highlight, in the context of stylized gift-exchange games, that individuals select more “expensive” partners who are more prone to display reciprocity. Indeed, following such reciprocal motives, we conjecture that plaintiffs are ready to pay higher flat fees (than their equilibrium value) expecting a positive return from lawyers in terms of effort. Indeed, prediction 4 was based on the equilibrium behaviour implying that attorneys should provide minimal effort

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<sup>23</sup>When considering figure 1, it appears that the FA and the FE treatments do not perfectly overlap. At first (periods 8 to 13), it seems that fees are higher under the American rule, whereas this difference reverts in the last five periods. Statistical tests however fail to find any significant difference in either subset of periods (WMW,  $p = 0.5218$  for periods 8-13 and  $p = 0.2971$  for periods 16-20)

<sup>24</sup>We remind that attorneys did not have any information regarding the value of the damage when submitting their fees. However, it could be that some attorneys react to previous observed losses (see e.g. Erev and Haruvy, 2013, for a discussion on the well-documented recency bias). There is no reason to observe this bias in contingent-fees treatments, as attorneys' fees are proportional to the loss and mechanically adapt to its variation.

Table 5: Average bids of Attorneys

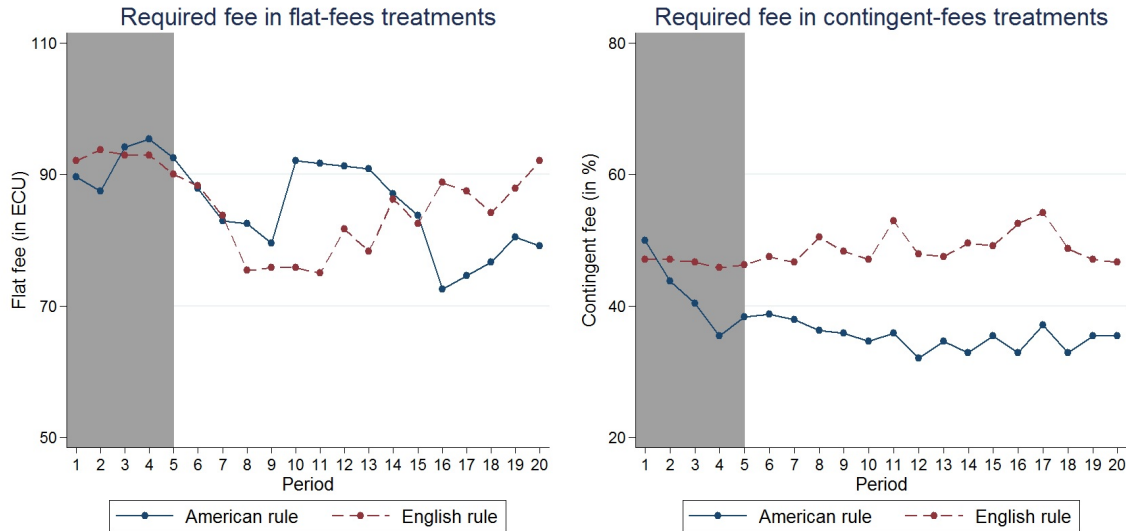
	All bids		Winning bids only	
	American rule	English rule	American rule	English rule
Flat fees	83.53 ECU (32.45)	82.89 ECU (28.64)	79.05 ECU (32.51)	79.49 ECU (27.09)
Contingent fees	35.19% (17.77)	49.08% (25.12)	31.50% (16.23)	45.31% (24.28)
<i>Amount received in case of success</i>	<i>120.38 ECU</i>	<i>148.16 ECU</i>	<i>113.00 ECU</i>	<i>140.62 ECU</i>

*Notes: Reported averages correspond to periods 6-20 of our experiment. Standard deviations are displayed in parentheses. The right panel reports average bids conditional on being selected at least once by a plaintiff. The amount received in case of success takes into account an average loss of 200 ECU and includes the fixed amount of 50 ECU.*

under flat fees. However, as we will show in the next subsections, attorneys do provide a non-negligible level of effort in all treatments and participants do not necessarily select the cheaper attorney on the market. In contingent-fees treatments, the contingent fees requested by attorneys are also higher than the minimum value of zero. This is consistent with prediction 4. Finally, our data show that contingent fees are higher under the English rule (CE treatment) than under the American rule (CA treatment). Prediction 3 states that the plaintiff has higher incentives to sue under the English rule than under the American rule, for a given fee arrangement, if the merit of the case is higher than a given threshold. This prediction is confirmed under contingent fees but not under flat fees. We believe that the better alignment of plaintiffs and attorneys interests under contingent fees makes plaintiffs more likely to trust lawyers and pay a premium when fee-shifting is implemented. Furthermore, we will also see that plaintiffs file suits more often in the CE treatment, irrespective of the characteristics of the case. It may encourage the lawyers to keep relatively high fees over time, as fewer lawyers experience unemployment in average. Also, as lower-quality cases are more often filed under the CE treatment than in other treatments, lawyers may want to claim higher contingency percentage to obtain the same monetary gains. In contrast, in the FE treatment, the English rule leads plaintiffs to “select cases” with more care. These findings are summarized in the following results.

**Result 1.** (i) *In all treatments, the requested level of fees are above the minimum value;* (ii) *Attorneys submit significantly higher bids when the fee-shifting rule is*

Figure 1: Attorneys' bids over time



Gray areas cover the periods 1 to 5, which are excluded from our statistical analysis.

introduced along contingent payments.

**3.2. Plaintiff's decision to file a suit.** We have drawn several theoretical predictions regarding plaintiff's decision to file a suit. First, we expect the proportion of suits filed to be increasing with both the level damage,  $D$ , and the merit of the case,  $\pi$  (see prediction 2). Provided that attorneys are not overpriced in contingent fees compared to flat fees settings, and that they respond positively to contingent incentives, plaintiffs in contingent-fees treatments should have higher incentives to file a suit than plaintiffs in flat-fees treatments. Moreover, we expect plaintiffs to file more lawsuits under the English rule compared to American-rule treatments, provided that the merit of the case is high enough (see prediction 3). Participation should also decrease with individual risk aversion of plaintiffs, especially under the English rule (see prediction 5). To test for those predictions, we first investigate how the compensation scheme of attorneys and the allocation of litigation costs affect the general participation rate of plaintiffs. Then, we explore in more details the characteristics of the cases for which participation varies between our treatments.

#### *Litigation rate*

Table 6 reports the trial rate in our four treatments. The proportion of litiga-

tion does not differ significantly between the FA treatment and the CA treatment (proportion test,  $p = 0.3964$ ). It also does not significantly differ between the FA treatment and the FE treatment (proportion test,  $p = 0.7058$ ). However, trial entry in the CE treatment is significantly higher than in the CA treatment (proportion test,  $p < 0.001$ ) and the FE treatment (proportion test,  $p = 0.0207$ ).

Table 6: Proportion of trial entry

	American rule	English rule
Flat fees	58.61%	57.22%
Contingent fees	61.74%	70%

*Notes: Reported proportions correspond to periods 6-20 of our experiment.*

Overall, only the combination of contingent fees and English rule leads to an increase in the general participation rate from plaintiffs. A more complete analysis is provided in table 7, which reports random-effect probit estimates on the determinants of trial entry. The level of fees on the experimental market is an important determinant of the decision to sue. Due to the nature of flat and contingent fees, we cannot include the level of fees as control if we do not separate flat-fees treatments and contingent-fees treatments. Column (1) of table 7 reports estimates on the pooled sample, with no control for the level of fees on the market. Column (2) of table 7 reports estimates on a subsample including the flat-fees treatments (FA and FE treatments), whereas column (3) reports estimates in the contingent-fees treatments (CA and CE treatments)

The *Contingent-fees* and *English rule* variables are treatment dummies. We control for the merit and loss of the case, the period and the individual risk tolerance of plaintiffs.<sup>25</sup> We include a *reverse order* dummy, that characterizes the sessions for which the order of cases between period 6 to 20 has been reversed. The interaction variables  $Merit \times English\ rule$  and  $Damage \times English\ rule$  aim at exploring whether the importance attributed to the parameters of the case varies when a fee-shifting mechanism is introduced. We control for the level of fees on the market by including a variable indicating the level of the minimum fee submitted by attorneys at this period. This variable takes a common value within a market and period.

<sup>25</sup>Risk tolerance is a variable ranging from 1 to 6, which takes value 1 if the individual has chosen the risk-free lottery and 6 if the individual has chosen the most risky lottery.

Table 7: Determinants of trial entry

	Probability to enter trial (Random-effect probit)		
	Pooled (1)	Flat fees (2)	Contingent fees (3)
Contingent fees	0.397** (0.198)	-	-
English rule	0.674 (0.440)	-0.673 (0.578)	2.009*** (0.526)
Minimum Fee	-	-0.014*** (0.004)	-0.004 (0.004)
Merit	1.908*** (0.321)	1.782*** (0.364)	2.100*** (0.468)
Damage	0.010*** (0.001)	0.009*** (0.001)	0.012*** (0.002)
Merit $\times$ English rule	-0.377 (0.429)	0.518 (0.522)	-1.199** (0.521)
Damage $\times$ English rule	-0.002 (0.002)	0.002 (0.002)	-0.005*** (0.002)
Period	-0.035*** (0.011)	-0.048*** (0.010)	-0.029** (0.015)
Risk tolerance	0.107 (0.069)	0.212** (0.083)	0.040 (0.115)
Reverse order	0.194 (0.197)	-0.052 (0.346)	0.222 (0.268)
Constant	-2.745*** (0.490)	-1.650*** (0.514)	-2.632*** (0.757)
Observations	1,425	720	705
Number of indiv	95	48	47

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Consistent with prediction 2, the litigation rate increases significantly with the level of the damage,  $D$ , and the merit of the case,  $\pi$ . Surprisingly, the impact of loss and merit is significantly lower (although still positive) in the CE treatment compared to the CA treatment (see model (3), net estimates of 0.007 for the loss and 0.901 for the merit of the case). As will be shown hereafter, participants in the CE treatment are more likely to file a suit for low-quality cases (i.e. cases with low merit). Column (1) of table 7 confirms that the probability to enter trial is higher in contingent-fees treatments compared to flat-fees treatment. This finding is in line with prediction 3.

The level of the minimum fee decreases the probability to file a suit in the flat-fees treatments, suggesting a preference for lower fees, as suggested by prediction 2. However, a closer look at the data indicates that plaintiffs select the cheapest attorney on the market in only 51.58% of the filed lawsuits under flat fees. In the flat-fees treatments still, the English rule does not have any impact on the decision to enter trial. Plaintiffs with higher risk aversion are less likely to file a suit, as suggested by the significantly positive coefficient associated to *risk tolerance*. This is in line with prediction 5.

In contrast with flat-fees treatments, the level of the minimum fee does not affect the probability to enter trial in the contingent-fees treatments. As discussed in the theoretical section of the paper (see prediction 2), the impact of the contingent fee  $\beta$  is ambiguous: cheaper attorneys may provide a minimal effort, and an intermediate value of  $\beta$  should be preferred, as it provides incentives for the attorney to exert effort. Furthermore, introducing the English rule increases the probability to enter trial, and decreases the importance of both the merit and the damage associated to the case at hand (see column (3) of table 7). In the following analysis, we develop this finding. We investigate how the fee arrangement and the cost-shifting rule in place affect the way plaintiffs select cases to pursue.

**Result 2.** *(i) Plaintiffs are more likely to file suits under contingent-fees compared to flat-fees treatments; (ii) Introducing the English rule increases the probability to go to trial in the contingent-fees treatment, but not in the flat-fees treatment.*

Finally, we observe that plaintiffs tend to file less suits over time, controlling for the characteristics of the cases. This downward trend in the proportion of filed suits appears in all treatments, and we do not believe it affects our main results. This



may be reflecting learning effects among plaintiffs, who initially tend to file more suit than is theoretically profitable, especially in lower-quality cases.

### *Case selection*

Model (3) of table 7 suggests that the merit and the damage of the case at hand have a rather low influence in the decision to enter trial in the CE treatment. As mentioned in introduction, the main purpose of the English rule is to deter frivolous claims. It is therefore legitimate to question a legal regime where plaintiffs would be encouraged to file all sort of cases, including non-meritorious ones. In the following, we investigate in more details the participation rates of plaintiffs across all cases presented in the experiment. Figure 2 displays for our four treatments a detailed overview of the participation rate of plaintiffs. We report for each case of damage  $D$  and merit  $\pi$  the frequency  $f_{l\pi}$  of participants filing a suit.

Figure 2 confirms that both higher merit and higher damage increase the participation rate of plaintiffs in all treatments. The CE treatment appears distinct from others, in that no single case is associated with a participation rate below 45%. We are particularly interested in the proportion of frivolous lawsuits filed between treatments. Let us define frivolous lawsuits as the three cases forming the bottom line of the heatmaps displayed in figure 2 (i.e.  $\{D = 100, \pi = 0\}$ ,  $\{D = 200, \pi = 0\}$  and  $\{D = 300, \pi = 0\}$ )<sup>26</sup>. In the CE treatment, 59.72% of frivolous lawsuits are filed. This is significantly higher than both the FA treatment (30.56%, WMW test,  $p = 0.0423$ ), the CA treatment (37.50%, WMW test,  $p = 0.0409$ ) and the FE treatment (30.56%, WMW test,  $p = 0.0286$ ). Comparing the FA, FE and CA treatments, we do not observe any significant difference.

These findings are summarized here.

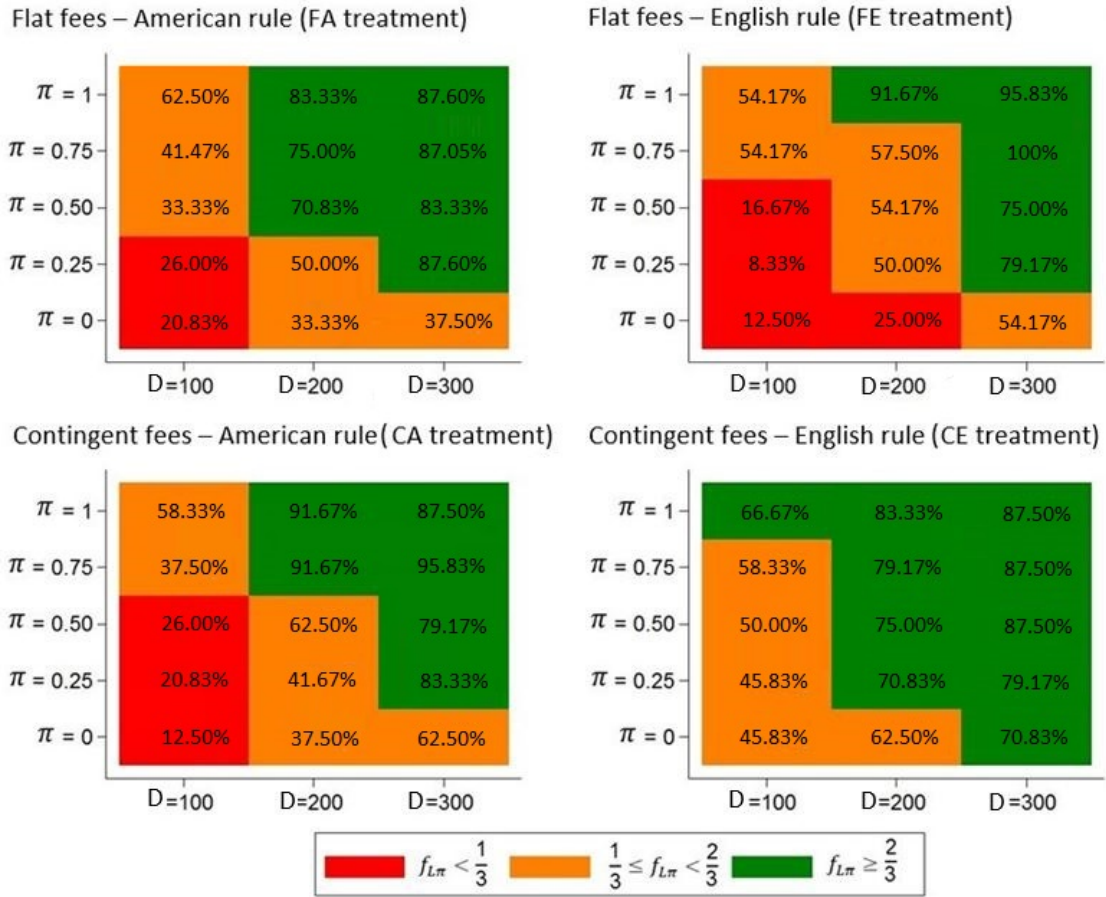
**Result 3.** (i) *The trial rate is generally higher in a setting that associates both contingent fees and English rule;* (ii) *This increase in the likelihood of litigation is mainly driven by the pursuit of claims with lower merit.*

Nevertheless, as our design does not allow attorneys to refuse a plaintiff's claim, we do not observe the potential screening effect that might differ between treatments.

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<sup>26</sup>An alternative way to proceed would be to define frivolous lawsuits as the three cases forming the bottom-left corner of the figure (i.e. cases implying the lowest expected earnings for the plaintiffs among all cases). Doing so would not alter our conclusions.

Figure 2: Proportion of suit filed according to merits and damages



Note: We report proportions for periods six to twenty only, such as each combination of Loss/Merit appears only once per plaintiff.

These results should thus be interpreted cautiously; they express plaintiffs' willingness to file a lawsuit, but do not necessarily represent lawsuits that would have been filed provided that attorneys had discretionary power. In the following, we shed light on the role that attorneys hold in the dynamics observed between treatments.

**3.3. Effort choice.** Our theoretical framework predicts that the lawyers' effort levels should be higher under contingent fees than under flat fees, depending on  $D$  and  $\pi$ , but should not be affected by the fee-shifting rule. Furthermore, we do not expect the merit of the case to have any influence on lawyers' effort levels (prediction 1). Table 8 reports the average effort of participants in the role of attorneys in our four treatments. Overall, attorneys in the contingent-fees treatments provide more effort than attorneys in the flat-fees treatments (WMW test,  $p < 0.001$ ). Consistent

with prediction 1, this difference is not significant if we consider only the cases where  $D = 100$  and  $\beta < 0.2$  ( $p = 0.442$ ). In those cases, the average effort is 4.143 for the contingent treatments and 3.405 for the flat-fees treatment (all  $f$  considered). In contrast, the difference is largely significant in cases with higher damage or higher contingent remunerations ( $p < 0.001$ ). In those cases, the average effort is 5.603 for the contingent treatments and 3.029 for the flat-fees treatment (all  $f$  considered). We also observe that the presence of the English rule matters when comparing flat and contingent fees. This difference is significant in the presence of fee-shifting (CE vs. FE, WMW test,  $p < 0.001$ ), but is not significant when fee-shifting is absent (FA vs. CA, WMW test,  $p = 0.4763$ ).

Table 8: Average effort of attorneys across treatment

	American rule	English rule
Flat fee	3.483 (2.973)	2.709 (2.211)
Contingent fee	4.103 (2.693)	5.310 (2.627)

*Notes: Reported averages correspond to periods 6-20 of our experiment. Standard deviations are displayed in parentheses.*

The effort level of attorneys is particularly high in the CE treatment. This observation should be connected to our previous findings. Contrasting with flat-fees, contingent fees provide incentives to perform for attorneys. This is especially the case under the English rule, where contingent remunerations are higher than under the American rule (see figure 1). Furthermore, the high level of effort provided by attorneys may explain the high participation rate of plaintiffs when both contingent fees and English rule are introduced. In order to substantiate these descriptive statistics, we estimate random-effect tobit models on the individual effort of attorneys. Results are reported in table 9. Estimates on the whole sample are displayed in column (1), whereas column (2) and (3) report estimates on the flat-fees and the contingent-fees treatments, separately.

Estimates reported in model (1) suggest that the effort provided by attorneys is significantly higher in the contingent-fees treatments than in the flat-fees treatments ( $p < 0.001$ ), confirming our previous descriptive and prediction 1.

The level of the fee has a positive influence in both flat-fees treatments (model (2)) and contingent-fees treatments (model (3)). In the contingent-fees regimes, the level

of the damage incurred by the plaintiff has an influence on the attorneys' contingent remuneration  $\beta D$ . In line with prediction 1, a higher damage increases significantly the level of effort.

Table 9: Determinants of attorney's effort

	Effort of attorneys (random effect tobit)		
	Pooled (1)	Flat fees (2)	Contingent fees (3)
Contingent fees	2.692*** (0.690)	-	-
English rule	-0.577 (0.972)	-4.400*** (1.652)	1.803* (1.086)
Merit	0.339 (0.422)	-0.997 (0.670)	1.179** (0.526)
Damage	0.003 (0.002)	-0.004 (0.003)	0.006*** (0.002)
English rule $\times$ Merit	0.587 (0.567)	2.073** (0.948)	-0.375 (0.681)
English rule $\times$ Damage	0.005 (0.005)	0.011*** (0.004)	-0.001 (0.003)
Period	-0.115*** (0.023)	-0.170*** (0.039)	-0.077*** (0.028)
Reverse order	0.786 (0.689)	0.557 (1.166)	0.868 (0.706)
Fee level	-	0.0144* (0.008)	0.047*** (0.009)
Constant	1.722* (0.935)	4.334*** (1.526)	0.358 (1.014)
Observations	882	417	465
Number of indiv	96	48	48

Standard errors in parentheses

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

In the flat-fees settings, neither the damage incurred by the plaintiff, nor the merit of the case are expected to have an influence on attorneys' level of effort. While results show that those variables do not influence the attorney's level of effort under the American rule (FA treatment), we observe a significant positive effect of these vari-

ables under the English rule (FE treatment). These estimates have to be interpreted along the dummy *English rule*, which also shows a strong negative and significant effect in the flat-fees settings.<sup>27</sup> Overall, it appears that the English rule does have an effect on the behaviour of lawyers: in the presence of fee-shifting, lawyers would provide higher efforts for meritorious cases but lower efforts for non-meritorious cases. In a flat-fees setting, we can consider that the lawyers' incentives to exert effort may be only due to reciprocal motives (as mentioned above) and/or to some sense of responsibility, which is related to the overall concept of intrinsic motivation (Charness, 2000). This intrinsic motivation may be amplified in the presence of the English rule, as the client face a greater risk compared to the American rule. One may however argue that lawyers acknowledge such responsibility for their client's case when the case has legitimately been filed, but not when the client pursued unmeritorious claims.

Model (3) reports that the English rule also affects attorney's effort in the contingent-fees treatments. Contrasting with the flat-fees treatment, this holds irrespective of the merit or the damage of the case. We observe a positive relationship between the level of merit and the level of effort provided by attorneys under the contingent remuneration scheme. This may reflect resignation from attorneys facing a too low probability to win the case and receive payment.

**Result 4.** (i) *Lawyer's effort is higher under contingent fees compared to flat fees;* (ii) *Lawyers provide more effort under the English rule, especially when claims are meritorious;* (iii) *Lawyer's effort is the highest in a legal regime that combines contingent fees and the English rule.*

The level of the fee affects lawyers' effort decision in the contingency treatments ( $p < 0.01$ ) and to a lower extent in the flat-fees treatments ( $p < 0.10$ ). This reciprocity might explain why plaintiffs do not always choose the cheapest lawyer on the market. However, the estimates reported in table 9 are low. If paying one additional ECU leads to increase the lawyer's expected effort by only 0.0144 units in the flat-fees treatments, then the plaintiff's best strategy would be to spend as little as possible in lawyer's fee. This is similar in contingent treatments. Except for the

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<sup>27</sup>One should remain cautious when interpreting those findings, as the number of observations varies largely between the cases. For instance, figure 2 shows that only 12.5% of the extreme ( $\pi = 0, D = 100$ ) cases are pursued by plaintiffs in the CE treatment.

extreme case of maximal damage, the plaintiff would always be better off choosing the cheapest contract. However, one has to be extremely careful when interpreting those point estimates. The coefficients are associated to quite high standard errors. Furthermore, these regression models are estimated to identify effects and do not aim at establishing accurate predictions. We do not believe that the estimations presented in table 9 can be used to identify the optimal contract for plaintiffs.

As it was the case for the plaintiffs' decision to enter trial, we observe a statistically significant period effect across all our treatments. Lawyers tend to provide less effort over time. We do not have the means to properly identify what drives this downward trend. This may for instance be related to subjects' learning. This might also reflect a willingness at first to increase plaintiffs' trust, to finally decrease the effort in the last periods of the game. This is however unlikely the case as we do not observe any endgame effect in our experiment, i.e., lawyers' effort provision does not sharply drop at the last period(s) of the game. This suggests that the effort of attorney is not (mainly) driven by strategic concerns.<sup>28</sup>

#### 4. CONCLUSION

In this paper, we analyze how the legal fee arrangement and the trial costs allocation rule may affect the efficiency of the litigation process, via their effect on the lawyer's effort, the deterrence of frivolous lawsuits and the plaintiff's incentives to go to court when his claim is meritorious. Our empirical results suggest that a legal regime mixing contingent fees and the English rule enhances lawyers' levels of effort, and encourages plaintiffs to pursue their claims. However, we also observe that meritless claims are significantly more frequent within this experimental legal regime. Overall, it seems that the coexistence of contingents fees and fee-shifting rule implies a trade-off between the aim to improve the efficiency of lawyer-client relationship by mitigating the moral hazard problem and the objective to deter frivolous lawsuits. From a public policy perspective, we hence argue that the tendency observed in European countries to give up flat fees should be associated to the implementation of mechanisms discouraging plaintiffs to go to court with meritless cases (even if it can be difficult to infer policy recommendations from specific experimental observations).

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<sup>28</sup>Remember that a plaintiff could not identify a lawyer from a period to another. Lawyers were not associated to an identifier, and were presented each period in a random order to plaintiffs.

The welfare implications of fee allocation rules and lawyers' compensation contracts are widespread, and much more work needs to be done to get a clear picture of the various matters that impinge on this issue. In this regard, some further experiments suggest themselves to tackle additional externalities due to cost-shifting and fee arrangement.

A first restrictive feature is related to the fact that our design rules out the possibility of pre-trial settlement. This restriction has been deliberately introduced because the issue of whether fee-shifting may enhance (or not) the likelihood of pre-trial agreements has been widely investigated in the literature on experimental law and economics. Furthermore, as mentioned by Katz (1988), decisions at earlier stages of a lawsuit depend on the parties' estimates of the consequences of trial. The analysis of the trial stage is therefore logically prior to any analysis of settlement negotiations. However, we know obviously that a large number of disputes do not rise the level of a lawsuit in practice (ending in a settlement), and a further step towards realism would thus imply to embed a bargaining stage in the present design. Second, our experiment highlights that contingent fees may promote plaintiffs' access to justice by allowing them to shift some share of the risk incurred in case of trial to their lawyers, which is not possible under flat fees (where lawyers are fully insured). In the literature, this transfer is considered as welfare improving: the lawyer presumably faces less risk than the client since it is easier for her to diversify the risks from lawsuits (see, e.g., Posner, 1986). Given our design, this welfare improving effect cannot be identified since the lawyers are not allowed to possess a portfolio of clients providing them the way to diversify. In an extended version of the present framework, it would be hence relevant to open the door for such a diversification behaviour.

Third, the litigation success function used in our experiment is additive, which implies that the merit of the case has no marginal effects and, hence, does not affect the equilibrium effort level (since the lawyer's marginal benefit from an increase in her effort does not depend on the merit). This assumption is obviously questionable because it is certainly not true in practice. Even if this restriction has been deliberately introduced to implement a simpler game-theoretic environment for the subjects, and follows Coughlan and Plott (1997), a further step towards realism would imply to relax it by considering an alternative function where the equilibrium effort level would be influenced by the merit of the judicial case (see, e.g., Carbonara *et al.*, 2015; Farmer and Pecorino, 1999; Hirshleifer and Osborne, 2001; Katz, 1988).

Such a context would allow us to check the robustness of our results to an alternative decision-making environment.

Finally, in the present paper, we consider that the client alone decides whether to go to court or to drop the case, which corresponds to the so-called “instrumentalist” approach to the decision-making allocation. In this perspective, it is assumed that the lawyer merely supplies the technical knowledge and skills necessary to implement the decision, as characterized by the litigation success function, while the client has the ultimate authority over the objectives. This assumption is based partly on literature where this allocation of power is considered (see e.g. Miller, 1987; Bebchuk, 1988; Hay, 1997; Choi, 2003; Hyde, 2006). However, to go further, it would be interesting to implement a “paternalist” framework in which lawyers get the exclusive decision-making authority: the plaintiff’s would be forced to rely upon his attorney’s recommendation on whether to pursue or drop the case. Following the model by Dana and Spier (1993), contingent fees could then be viewed as a suitable screening mechanism: under contingency, the attorney is incited to pursue only the sufficiently-high-probability-of-prevailing cases (since her payoff is tied on the trial’s outcome), while she is encouraged to lead her client blindly into litigation – regardless of the case merit – under flat fees.<sup>29</sup> As mentioned above, our experiment does not allow us to capture this screening effect since the lawyer’s participation constraint is always fulfilled (although she can still decide virtually not to defend the case by choosing the lowest possible level of effort).

Overall, an experimental design based on some of these extensions would certainly provide a more complete and robust analysis of the effects that fee contracts and cost-shifting rules may have in litigation. However, a narrowed focus is obviously required when conducting empirical studies, and these effects are so widespread that any attempt to fully ascertain them was far beyond the scope of our study.

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<sup>29</sup>Note that Cotten and Santore (2012) emphasize a different screening phenomenon in their experiment by showing that contingent fees can enable clients to screen out low-quality attorneys who obtain smaller awards in expectation. In this context, contingency may improve the efficiency of the lawyer-client relationship by improving the quality of legal services.



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## APPENDIX

### A - Experimental procedure

Table A1 : Sequence of cases in odd and even experimental sessions

Period	Order A - Odd sessions		Order B - even sessions	
	Damage ( $D$ )	Merit ( $\pi$ )	Damage ( $D$ )	Merit ( $\pi$ )
1	200	0.25	200	0.25
2	300	1	300	1
3	100	0.50	100	0.50
4	300	0	300	0
5	200	0.75	200	0.75
6	100	1	200	0.75
7	100	0	100	0.50
8	200	0	300	0.50
9	100	0.25	300	1
10	300	0.25	200	1
11	100	0.75	300	0.75
12	200	0.25	200	0.50
13	300	0	300	0
14	200	0.50	200	0.25
15	300	0.75	100	0.75
16	200	1	300	0.25
17	300	1	100	0.25
18	300	0.50	200	0
19	100	0.50	100	0
20	200	0.75	100	1

Parameters vary between odd and even sessions in periods six to twenty. All possible damage-merit combinations were covered in this sequence of fifteen periods.

## B - Some analytical predictions<sup>30</sup>

### B1 - Prediction 2 (i)

Given the predicted effort levels chosen by the lawyer at the third stage and the experimental values for the theoretical parameters, the plaintiff's participation constraint (i.e.  $\Pi_p^i \geq 400 - D$ ) is fulfilled in FA treatment if and only if:

- $f = 50$  when  $\pi = 1$  (with  $D = 100$ ).
- $f \leq 60$  when  $\pi = 0.5$ ,  $f \leq 90$  when  $\pi = 0.75$ , and  $f \leq 110$  when  $\pi = 1$  (with  $D = 200$ ).
- $f \leq 60$  when  $\pi = 0.25$ ,  $f \leq 100$  when  $\pi = 0.5$ ,  $f \leq 130$  when  $\pi = 0.75$ , and  $\forall f$  when  $\pi = 1$  (with  $D = 300$ ).

While trial should not occur when  $D = 100$  and  $\pi < 1$ ,  $D = 200$  and  $\pi = \{0, 0.25\}$ , or  $D = 300$  and  $\pi = 0$ .

The plaintiff's participation constraint is satisfied in FE treatment if and only if:

- $f \leq 60$  when  $\pi = 1$  (with  $D = 100$ ).
- $f = 50$  when  $\pi = 0.5$ ,  $f \leq 80$  when  $\pi = 0.75$ , and  $f \leq 120$  when  $\pi = 1$  (with  $D = 200$ ).
- $f \leq 80$  when  $\pi = 0.5$ ,  $f \leq 130$  when  $\pi = 0.75$ , and  $\forall f$  when  $\pi = 1$  (with  $D = 300$ ).

While trial should not occur when  $D = 100$  and  $\pi < 1$ ,  $D = \{200, 300\}$  and  $\pi = \{0, 0.25\}$ .

### B2 - Prediction 2 (ii)

Given the predicted effort levels chosen by the lawyer at the third stage and the experimental values for the theoretical parameters, the plaintiff's participation constraint (i.e.  $\Pi_p^i \geq 400 - D$ ) is fulfilled in CA treatment if and only if:

- $\beta \leq 0.1$  when  $\pi = 1$  (with  $D = 100$ ).

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<sup>30</sup>As mentioned above, these analytical predictions are based on simple but tedious calculations that we have deliberately chosen – for clarity of exposition – not to provide here. However, the corresponding computer files are available upon request.

- $\beta \leq 0.3$  when  $\pi = 0.5$ ,  $\beta \leq 0.5$  when  $\pi = 0.75$ , and  $\beta \leq 0.6$  when  $\pi = 1$  (with  $D = 200$ ).
- $\beta \leq 0.4$  when  $\pi = 0.25$ ,  $\beta \leq 0.6$  when  $\pi = 0.5$ , and  $\beta \leq 0.7$  when  $\pi = \{0.75, 1\}$  (with  $D = 300$ ).

While trial should not occur when  $D = 100$  and  $\pi < 1$ ,  $D = 200$  and  $\pi = \{0, 0.25\}$ , or  $D = 300$  and  $\pi = 0$ .

The plaintiff's participation constraint is satisfied in CE treatment if and only if:

- $\beta \leq 0.2$  when  $\pi = 1$  (with  $D = 100$ ).
- $\beta \leq 0.2$  when  $\pi = 0.5$ ,  $\beta \leq 0.6$  when  $\pi = 0.75$ , and  $\beta \leq 0.7$  when  $\pi = 1$  (with  $D = 200$ ).
- $\beta \leq 0.5$  when  $\pi = 0.5$ , and  $\beta \leq 0.7$  when  $\pi = \{0.75, 1\}$  (with  $D = 300$ ).

While trial should not occur when  $D = 100$  and  $\pi < 1$ ,  $D = 200$  and  $\pi = \{0, 0.25\}$ , or  $D = 300$  and  $\pi = 0$ .

### **B3 - Prediction 3 (ii)**

Following the plaintiff's participation constraints applying under flat fees, the plaintiff is more incited to sue with the English rule in place if and only if:

$$g(e)(100 + D) - f - 50 \geq g(e)D - f \Leftrightarrow g(e) \geq \frac{1}{2} \text{ with } e = e^{FE} = e^{FA}$$

Given the parameters chosen in the experiment (i.e.  $\alpha = 0.5$  and  $e_D = 5$ ) and the lawyer's effort level which is predicted in the case of flat fees (i.e.  $e = 1$ ), this condition is satisfied if and only if  $\pi = 1$ . Note however that the following condition must also be fulfilled in order for a trial to occur under both flat fees and English rule:

$$g(e)(100 + D) - f - 50 \geq 0$$

Following B1 - Prediction 2 (i) above, this second condition leads to additional restrictions on the values of  $D$  and  $f$ : given  $\pi = 1$ , we must have  $f \leq 60$  when  $D = 100$  and  $f \leq 120$  when  $D = 200$  (while  $f$  can take any possible value when  $D = 300$ ).

Following the plaintiff's participation constraints occurring with contingent fees, the plaintiff is more incited to sue under the English rule if and only if:

$$g(e)D(1 - \beta) - (1 - g(e))100 \geq g(e)D(1 - \beta) - 50 \Leftrightarrow g(e) \geq \frac{1}{2} \text{ with } e = e^{CE} = e^{CA}$$

Given the parameters chosen in the experiment (i.e.  $\alpha = 0.5$  and  $e_D = 5$ ) and the lawyer's effort levels which are predicted under contingent fees, this condition is satisfied if and only:

(a)  $\beta \geq 0.4$  and  $\pi = 0.75$ , or  $\forall \beta$  and  $\pi = 1$  (with  $D = 100$ ).

(b)  $\beta \geq 0.2$  and  $\pi = 0.75$ , or  $\forall \beta$  and  $\pi = 1$  (with  $D = \{200, 300\}$ ).

Furthermore, the following condition must also be fulfilled in order for a trial to occur under both contingent fees and English rule:

$$g(e)D(1 - \beta) - (1 - g(e))100 \geq 0$$

Following B2 - Prediction 2 (ii) above, this second condition leads to additional restrictions implying that (a) and (b) can be satisfied if and only if:

(c)  $\beta \leq 0.2$  when  $\pi = 1$  (with  $D = 100$ ).

(d)  $\beta \leq 0.6$  when  $\pi = 0.75$ , and  $\beta \leq 0.7$  when  $\pi = 1$  (with  $D = 200$ ).

(e)  $\beta \leq 0.7$  when  $\pi = \{0.75, 1\}$  (with  $D = 300$ ).

Overall, combining (a) – (e), the plaintiff is more incited to sue under the English rule, when contingent fees are in place, if and only if:

- $\beta = \{0, 0.1, 0.2\}$  when  $\pi = 1$  (with  $D = 100$ ).
- $\beta = \{0.2, 0.3, 0.4, 0.5, 0.6\}$  when  $\pi = 0.75$ , and  $\beta = \{0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7\}$  when  $\pi = 1$  (with  $D = 200$ ).
- $\beta = \{0.2, 0.3, 0.4, 0.5, 0.6, 0.7\}$  when  $\pi = \{0.75, 1\}$  (with  $D = 300$ ).



## **C - Experimental instructions**

### **General instructions**

This experiment is part of a research program in economics that aims at studying individual decisions. You will take several decisions that will be described in the following instructions. Your earnings will depend on your decisions, and in some cases, on the decisions of other participants in the experiment. It is therefore important to read these instructions carefully.

During the experiment, the monetary amounts will be expressed in Experimental Currency Units (ECU). All ECU earned during the experiment will be converted to euros once the experiment is over. The conversion rate is as follows: €1 = 25 ECU. All your answers will be treated anonymously. Your identity will not be displayed to other participants, nor to the experimenter.

At the beginning of the experiment, a role will be assigned to you randomly. You will take either role A or role B. This role will determine the actions you can undertake in the rest of the experiment. You will keep this role throughout the whole experiment.

The experiment is divided into three phases. The instructions of the first phase are provided in the rest of this document. Once this first phase is completed, we will distribute the instructions of the second phase to continue the experiment.

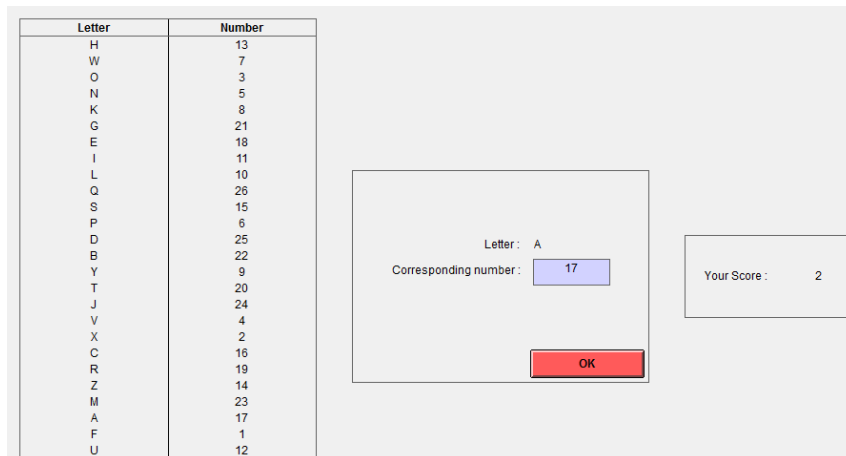
Please make sure that your cell phone is turned off, and remember that you are not allowed to communicate with other participants in the room.

### **Phase 1**

Only role A participants take part in phase 1. If you were randomly assigned the role B at the beginning of the experiment, you will face a waiting screen and you will have no action to perform during phase 1.

If you are a participant A, you will take part in a four-minutes decoding task. This task consists in decoding letters into numbers. The display on your screen you will be divided into three parts (see the following screenshot).

## Screenshot of decoding task



A two-columns table is displayed on the left side of the screen. The first column contains all letters of the alphabet, with no specific order. The second column reports the numbers corresponding to each of these letters. Your task is to find for a specific letter the number that corresponds to it.

The letter you have to look for is displayed in the central part of the screen. You will need to enter in the typing field the number corresponding to this letter, then click on the "OK" button. If your answer is correct, your score will increase by one. A new letter will then appear and you will have to search again for the corresponding number in the table on the left of the screen. If your answer is incorrect, a message will warn you of your mistake and you will have to try again to enter the correct answer for the same letter.

The number of correct answers you provided is displayed on the right side of the screen. Each time you enter a correct answer, this number increases by one. This is your score at this task.

Your score in Phase 1 as Participant A will determine your initial endowment in Phase 2. This is the maximum gain you can get for Phase 2 of the experiment. This initial allocation is calculated as follows:

$$Endowment = \begin{cases} Score \times 20ECU, & \text{if score} < 20 \\ 400ECU, & \text{if score} \geq 20 \end{cases}$$

The amount of your initial endowment can not exceed 400 ECU. Thus, if you reach a score of 20, the additional tasks you perform will not be taken into account in the calculation of your gain.

When the four minutes are over, a screen will inform you of your score and your earnings. We will then give you new instructions to continue the experiment.

## **Phase 2**

Phase 2 is composed of 20 independent periods. A single period can include several interactions with different players. A single interaction will be randomly drawn to calculate your final earnings for Phase 2. Throughout these 20 periods, you will interact within the same group of participants. This group consists of four participants A and four participants B.

We first describe the general structure of phase 2, depending on your role. We will then describe in detail each of the three stages of a period.

### **If your role is A**

You start each period with the initial endowment you earned in Phase 1. At the beginning of each period, you will experience a random loss on that endowment. This loss can amount to 100 ECU, 200 ECU or 300 ECU.

At each period, you will have the opportunity to choose and pay a participant B to try to “recover your loss”, i.e. to cancel it. Your chances of recovering your loss will depend on the effort that will be provided by the participant you selected. The manner in which participant B’s effort affects your chances of recovering the loss is presented in the following of these instructions.

As a participant A, you will observe at the beginning of the period the amount of the loss incurred, and the chances you have to recover this loss, according to the effort of participant B. You will then be able to choose the participant B with whom you wish to associate. Please note that you can choose to select no participant. You will observe at the end of the period whether your loss was recovered or not, as well as your earnings for the period.

The calculation of your win for this period will take into account your initial endowment, the loss incurred if it has not been canceled and Player B’s remuneration, if you choose one.

## **If your role is B**

You start each period with an initial allocation of 100 ECU. During Phase 2, you may be selected by one (or more) participant(s) A who has/have suffered a loss. As a first step, you will have to declare the remuneration you claim from a participant A if she/he decides to select you. The choice of participants A will only be based on the remuneration requested by the four participants B, including you.

If you are not selected by any participant A, your gain for the period will be your initial endowment of 100 ECU. If you are selected, you will need to select a level of effort that will affect the likelihood that Participant A recovers her/his loss. The higher your effort, the greater the chances of recovering the loss.

You will face throughout the experiment different situations where the probability of recovering the loss will vary. The way your effort affects the chances of recovering the loss is presented in the following of these instructions. In addition, for each unit of effort you choose to provide, you will have to pay a cost. The costs are also presented in detail at the end of these instructions.

The calculation of your earnings for this period will take into account your initial allocation of 100 ECU, the remuneration received from the role A participant, if you are chosen, and the cost associated with the effort you select. If you are selected by multiple participants B in the same period, only one interaction will be randomly drawn to determine your winnings during that period.

### **Step 1 (Role B participant)**

The remuneration that Participant B pays to Participant A consists of two components. A fixed component of 50 ECU, and a variable component, which depends on the amount of the loss and if the loss is recovered. In Step 1, Participant B reports what percentage of the loss she/he will receive if the loss is recovered.

Thus, the reported earnings are expressed as a percentage of the loss incurred by Participant A. The reported earnings must lie between 0% and 100% of the loss incurred by Participant A. You receive this compensation only if the loss of participant A is covered. If the random draw determines that Participant A's loss is not recovered, your remuneration is equal to 50 for that period. If the loss incurred by Participant A is recovered, your remuneration is equal to 50 + the earnings you reported. Take for example a claimed remuneration of 50% and a loss incurred by

participant A equal to 200 ECU. If the random draw determines that the loss of the participant A is recovered you receive from participant A:  $50 + 50\% \times 200 = 150$  ECU).

Here is what will appear on the screen when you take a decision in step 1:

Please indicate the remuneration you wish to obtain if you are selected at this period, and if the loss is recovered. This remuneration must lie between 0% and 100%, and must be a multiple of 10.

Your Choice (in percentage) :

## Step 2 (Role A participant)

In step 2, at each period, each of the four A participants in the group can select a participant B of their choice in an attempt to recover the loss they incur. The screen that will be displayed when you make a decision (if you are in role A) is shown below:

Your loss at this period : 200 ECU.				
Effort of B	Probability of success	Cost for B		
1	33.33%	0 ECU		Claimed remuneration if the loss is recovered
2	39.29%	1 ECU	10 %	<input style="background-color: #cccccc; padding: 2px 5px;" type="button" value="Choose this participant"/>
3	43.75%	4 ECU	20 %	<input style="background-color: #cccccc; padding: 2px 5px;" type="button" value="Choose this participant"/>
4	47.22%	9 ECU	50 %	<input style="background-color: #cccccc; padding: 2px 5px;" type="button" value="Choose this participant"/>
5	50.00%	16 ECU	40 %	<input style="background-color: #cccccc; padding: 2px 5px;" type="button" value="Choose this participant"/>
6	52.27%	25 ECU		
7	54.17%	36 ECU		
8	55.77%	49 ECU		
9	57.14%	64 ECU		
10	58.33%	81 ECU		<input style="background-color: red; color: white; padding: 2px 5px; border: 1px solid black;" type="button" value="Choose no participant"/>

This screen is composed of three parts. In the upper part of the screen, you observe your loss incurred at this period. On the left side of the screen, you can see how Participant B's effort can affect the likelihood of recovering your loss. If you choose a participant B, she/he will choose one of those levels of effort during the third step of the period. This table will vary with each period, so it is important to always pay attention. In the right part of the screen, you observe the remuneration requested by participants B during phase 1. You can then select a participant B of your choice by clicking on "choose this participant" at the desired line. You can also choose no participant by clicking on the button "Choose no participant". If you do not choose any participant, you will not recover the loss incurred during this period, and you will not pay any participant B.

If you choose a participant, you will have to pay the remuneration indicated by the participant B you selected only if your loss is recovered. This compensation is expressed as a percentage of the loss you suffered during this period. (For example, for a loss equal to 300 EMUs, a 50% remuneration will cost you  $50 + 50\% \times 300 = 200$  ECU).

Two scenarios are to be distinguished if you choose a participant:

1) If the random draw determines that you are recovering your loss, you will pay the full remuneration of Participant B (50 ECU + the percentage of the recovered loss). In addition, you will receive an additional 50 ECU that will be added to your gain for that period. This sum compensates in part the remuneration that you pay to participant B.

2) If the random draw determines that you are not recovering your loss, you will only pay the fixed component of Participant B's remuneration (50 ECU). In addition, 50 additional ECU will be withdrawn from your gain for this period.

If you are a role B participant, you will observe the requested remunerations in your group. You will have no decision to take during step 2.

### Step 3 (Role B participant)

In step 3, at each period, each participant B selected by at least one participant A will decide what level of effort to provide. If you have not been selected by any participant A, you have no decision to take in this step 3 and your earnings for this period will be equal to 100 ECU. If you have been selected, you can decide for a level of effort between 1 and 10. Each level of effort is associated with a probability for the participant A who chose you to recover her/his loss. If you choose an effort that costs more than the compensation you have requested, the difference will be deducted from your initial endowment of 100 ECU.

Loss of participant A at this period : 200 ECU  
Claimed remuneration at this period : 30 %

Effort	Probability of success	Cost
1	33.33%	0 ECU
2	39.29%	1 ECU
3	43.75%	4 ECU
4	47.22%	9 ECU
5	50.00%	16 ECU
6	52.27%	25 ECU
7	54.17%	36 ECU
8	55.77%	49 ECU
9	57.14%	64 ECU
10	58.33%	81 ECU

Please enter an effort value between 1 and 10 :

The probabilities of success vary according to the period, so it is important to pay attention to this table for every decision you make. You will need to make a decision per participant who will have chosen you. If you have been chosen by three A participants, you will have to take three decisions as shown in the previous screenshot. At the end of the period, a random draw determines whether the loss of Participant A is canceled or not. If the participant A chooses not to select any participant B, the loss can not be canceled. If the participant A chooses to select a participant B, the probability of the loss being canceled is the one corresponding to the effort provided by the participant B who is chosen.

Your earnings :

When the 20 periods of play are over, one of these periods will be randomly drawn to calculate your earnings. Your earnings for a period is calculated as follows :

**If you are a Role A participant :**

If you do not select any participant B :

$$Earnings = (Initial\ endowment) - (Loss)$$

If you select a participant B :

- If the loss is not covered

$$Earnings = (Initial\ endowment) - (Player\ B\ remuneration) + 50$$

- If the loss is covered

$$Earnings = (Initial\ endowment) - (Loss) - (Player\ B\ remuneration) - 50$$

**If you are a Role B participant :**

If no participant A has selected you :

$$Earnings = 100$$

If a participant A has selected you :

$$Earnings = 100 + (Remuneration\ received\ from\ player\ A) - (Cost\ of\ effort\ you\ have\ chosen)$$



The remuneration received from Player A depends on the recovery of the loss:

If the loss is not covered :

*Remuneration received from player A = 50*

If the loss is covered :

*Remuneration received from player A = 50 + (proportional amount of the loss)*

If more than one A participant has selected you, one of the interactions with Participants A will be randomly drawn to determine your earnings for that period.

Once the period is over, each participant will see on their screen a summary of the decisions that have been made and the gain for that period. The next period will start automatically.

Your gain for Phase 2 will not be communicated to you until the end of the experiment.

### Phase 3

In Phase 3, you must choose a lottery from six available lotteries. Your earnings will depend on the outcome of the lottery you choose. For each lottery, two outcomes are achievable: the outcome A or the outcome B. Following your choice, the computer will proceed with a coin toss to determine the outcome of the lottery. In consequence, outcome A and outcome B both have a 50% probability to apply.

The following table reports the different lotteries available for you to choose.

<b>Lottery</b>	<b>Outcome A</b>	<b>Outcome B</b>
1	5.60 Euro	5.60 Euro
2	7.20 Euro	4.80 Euro
3	8.80 Euro	4.00 Euro
4	10.40 Euro	3.20 Euro
5	12.00 Euro	2.40 Euro
6	14.00 Euro	0.40 Euro

For instance, if you select Lottery 3, you will have 50% chance of winning €8.80 and 50% chance of winning €4.

Following your decision, the screen will display your final earnings for Phase 2 and for Phase 3 of the experiment. You will then have to answer a short questionnaire before receiving your payment in cash.