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Gambling for the Upper Hand –
Settlement Negotiations in the Lab

by

Topi Miettinen
Olli Ropponen
Pekka Sääskilahti

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Topi Miettinen [†]   Olli Ropponen [‡]   Pekka Sääskilahti [§]

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Abstract

We exploit a controlled non-framed laboratory experiment to study settlement negotiations and the plaintiff's decision to raise a lawsuit in case of an impasse. We find that greater variance in court outcomes increases the litigation rate. Further analysis suggests that this is due to the reflection effect in plaintiffs' loss aversion who treat disadvantageous inequality as a loss and who are thus willing to take negative expected value bets for more equality. When studying the settlement negotiations, the best-fitting logit-quantal-response-equilibrium predicts observed comparative statics patterns not predicted by the subgame perfect equilibrium.

KEYWORDS: bargaining; litigation; loss aversion; quantal-response equilibrium; settlement

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[†] *Address:* Hanken School of Economics, Dept of Economics, HECER, Arkadiankatu 7, PO Box 479, Fi-00101 Helsinki and SITE, Stockholm School of Economics, *E-mail:* topi.miettinen@hanken.fi, *Telefax:* 09-431 33 333 *Tel: +358 40 352 1406*

[‡] *Address:* Government Institute for Economic Research (VATT), Arkadiankatu 7, PO Box 1279, Fi-00101 Helsinki, *E-mail:* olli.ropponen@vatt.fi

[§] *Address:* Nokia Corporation, Keilalahdentie 2-4, Fi-00250 Espoo, *E-mail:* pekka.saaskilahti@nokia.com

1 Introduction

Extensive theoretical and experimental literature regards asymmetric information about the likely sentence as the main impediment to settlement (Daugherty, 2000). Babcock et al. (1995) provide experimental evidence that introducing asymmetric information severs bargaining inefficiencies. Recent findings suggest that psychological biases might for their part contribute to the failure to reconcile a deal. Firstly, early theoretical work in this domain highlights the role of mutually incompatible self-serving beliefs in bringing negotiations to a deadlock (Gould, 1973; Landes 1971; Posner, 1973; Shavell, 1982). Experimental research reviewed in Babcock and Loewenstein (1997) indeed came to confirm this view. Secondly, psychological biases in risk attitudes may also bring about negotiation deadlocks. While lawyers have extensively studied the topic in non-incentivized and framed experiments (Rachlinski, 1996; Guthrie, 2000; Korobkin 2002; Guthrie 2003) it has received little attention among economists, and in addition to Delrossi and Phillips (1999) few incentivized laboratory studies on the topic exist.

In an attempt to narrow this gap, and building on the work on behavioral law and economics summarized in Guthrie (2003) or more broadly in Camerer and Talley (2007) and Jolls (2007), we study the effect of dispersion in trial outcomes on settlement and litigation in a non-framed, anonymous computerized experiment. In our design, parties first attempt a settlement through take-it-or-leave-it offers. A failure to strike a deal gives one party of the negotiations an option either to acquiesce or to engage in inefficient rent-seeking. Settlement negotiations prior to the plaintiff's decision to raise a lawsuit constitute a typical application of the setup. To fix ideas, let us therefore proceed with the legal context terminology in what follows while keeping in mind the wide range of alternative applications. In addition to the typical advantages of controlled experimentation put forward by numerous authors,[1] there is an added advantage of the adopted methodology in the study of legal disputes. Settled cases are under-represented in field data whereas a laboratory experiment fully avoids this selection bias.[2] It is particularly difficult to find unbiased data with natural independent variation in dispersion of court decrees. There may prevail differences in dispersion in adjudications across countries and jurisdictions but these latter also differ in many other key aspects which also might influence settlement and litigation and the selection biases in the data.

Our design excludes asymmetric information and self-serving biases *about likely decrees* as explanations for impasse.[3] The decision to litigate results in a computerized court ruling with an exogenous and publicly known probability of winning and losing, and equally large publicly

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[1] See Falk and Heckman (2009), for instance.

[2] External validity poses a challenge to lab studies and ideally the field and the lab complement each other in promoting our understanding of such disputes.

[3] Naturally there may be incomplete information about individual characteristics such as traits associated with risk-aversion or other-regarding preference.

known expenses to each side of the dispute.[4] We experimentally vary (i) the plaintiff's probability of winning, (ii) the expenses of going to court, and (iii), while preserving the expected payoffs at court, whether the court rulings are risky.

We find that the litigation rates are higher with aleatory adjudication. Plaintiffs choose to litigate more often than not even when doing so is suboptimal. This finding has at least three non-exclusive explanations (i) illusion of control (Langer, 1975); (ii) loss aversion, and (iii) overweighting of small probabilities (Tversky and Kahnemann, 1992). Our evidence favors the second explanation: the plaintiffs are willing to take negative expected value bets for more equality.[5]

Turning interest to the laboratory negotiations preceding the litigation choices, we find that settlement rates are highest when it is expensive to appeal. This is in line with the predictions of traditional theory: higher legal expenses should increase the scope for settlement.[6] Indeed, the comparative statics predictions of the logit-quantal-response equilibrium, a parametric generalization of the Nash equilibrium, capture well the treatment effects on the settlement rate in our data as well as the observed litigation rates. Yet, due to a small twist in our experimental design, subgame perfect equilibrium fails to pass the hurdle. Thus, our design allows to point out some limitations of prescriptive rationality assumptions in empirical work which can be circumvented by the adoption of more empirically driven concepts.

Yet, we also find that variant decrees induce more disagreement when the plaintiffs have scant chances of winning. This finding stands in contrast to the expected utility prediction that risk-averse subjects should take more precaution in securing a deal when court decrees are more variant and thus the scope for settlement should be larger. The result cannot be construed by alternative solution concepts. Contrary to our results, Ashenfelter et al. (1992) found that (commonly known) more erratic arbitration increases the settlement rate. As Delrossi and Phillips (1999), they studied effects of *forced arbitration* if failing to agree. In our setup, arbitration is costly and an option chosen by the plaintiff; we can also study the very choice of pursuing or withdrawing the court case. When legal costs are high, however, our findings are in line with those of Ashenfelter et al.: settlement rate is higher when there is more variance in court rulings.

Delrossi and Phillips (1999) also set up a non-framed incentivized laboratory experiment to study the effects of risky court rulings on settlement negotiation outcomes and come up with evidence in line with the reflection effect of loss aversion as we do. While Delrossi and Phillips

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[4]Thus our study reflects the American rule, see Plott (1987) for an experimental comparison of the English and American rules of attribution of legal expenses.

[5]Yet, given the findings of Linde and Sonnemans (2012), we must must not rush into conclusion that a simple extension of prospect theory where where loss-gain reference is driven by equal payoffs would provide a satisfactory model of social risk taking.

[6]See Hay and Spier (1998), for instance.

focused on the interaction between asymmetric information and risky court outcomes, our interest lies in the interaction between risk attitudes and other-regarding concerns. The present paper also provides novel design features - independent variation in court rulings and control for the costliness of court outcomes - which allow sharper identification of the pure effect of risk and the interaction effect of interest. Linde and Sonnemans (2012) run an experimental study studying how other-regarding and risk preferences interact. Unlike us, they observe patterns in line with risk aversion when choosing between lotteries where one's payoff falls short of that of the opponent. Their focus in this loss domain is on a particular class of lotteries where only the payoff of the decision maker depends on the lottery outcomes while there is no variation in the opponent's payoff. Thus there is no option of choosing lotteries which are both costly punishments and gambles for more equality at the same time, a feature which may be essential for litigation choices after a failed settlement outcome.

The paper is structured as follows. In the follow-up section, we lay out the model and the experimental setup. In Section 3 the empirical results regarding litigation behavior are studied while Section 4 resumes the behavioral patterns in settlement negotiations. We draw conclusions in Section 5.

2 Experimental design and Theoretical background

2.1 Framework

In this section we present a stylized model of settlement negotiations and litigation. There are two players: the plaintiff (P), and the defendant (D). The players engage in commercial negotiations over a sharing of value X, which is common to both parties. In the experiment, we set $X = 200$. If negotiations break, the plaintiff will have a possibility to sue the defendant to claim a share of X. The model treats the implications of a won court case on the defendant as a "court-imposed profit-share". As an example, the plaintiff assumes the role of a patent holder and the defendant is an alleged infringer of the patent rights, and the court imposed profit share corresponds to damages paid to the plaintiff by the defendant. If P wins the court case, he receives a total of rX of damages where $r \in (0, 1)$ is the court-imposed profit-share, set equal to 2/5 in the experiment. The probability that P wins the court case is p. In the experiment we consider two alternative values, $p = 0.7$ and $p = 0.1$ where the latter condition is coined as the *low chance* for P's victory. Litigation is costly as both parties incur legal costs L. We assume that both parties pay their own costs of trial irrespective of the court outcome (i.e. American legal system). There are two alternative legal cost conditions in the experiment $L = 10$ and $L = 58$ where the latter holds in the so called *high cost* of litigation condition (see Table 1).

If the parties reach an ex ante agreement (prior to litigation), they share the value X in corresponding shares. Let us denote P's share in such an agreement by s (so that P gets sX) and D's share by $(1 - s) X$. If the parties fail to reach an ex ante agreement, then P chooses

whether to litigate or not.

If P decides to litigate, then her expected return is

$$prX + Y - L, \tag{1}$$

and the expected return for D is

$$(1 - pr) X - L. \tag{2}$$

Not litigating yields Y for P while D gets X. We have three cases in focus: *benchmark condition* ($p = 0.7, L = 10$), *low chance condition* ($p = 0.1, L = 10$), and *high legal costs condition* ($p = 0.7, L = 58$). The parameters are chosen so that the expected payoff for the plaintiff coincides in the latter two conditions. The plaintiff's winning probability was public information to all subjects.

We endow P with a small additional payment $Y = 10$, which he gets only in the case where no ex ante agreement is reached. In our design, Y is there to slightly perturb the balance to point out some limits of sequential rationality and subgame perfection in empirical work (as will be explained shortly).

In the experiment, for the sake of tractability, negotiations take a specific and simple form where each party makes a take-it-or-leave-it offer to the other and one of the proposals is randomly drawn as the actual proposal, each with probability 50%. In this special case of random-proposer ultimatum bargaining, actually one of the parties has all bargaining power in sketching a proposal and the other party is only granted a right to veto it. This extreme experimental variation in bargaining power is also exploited in the design of Delrossi and Phillips (1999) but not within a match but across sessions/treatments. Asking for each party to contrive a proposal for one contingency and a *minimal acceptable offer (MAO)* for the other within a match allows us to collect more informative negotiation plans in a concise and simple manner. The structure and the payoffs of the bargaining game are illustrated in Figure 1 below.

2.2 Experimental setup

The computerized experiment was conducted in the laboratory of the Max Planck Institute of Economics in Jena in May 2008, February 2010, and August 2010. Participants were 316 undergraduates from the University of Jena[7], randomly drawn from different fields of study. Participants were recruited using the ORSEE software (Greiner, 2004) and the experiment was programmed with the z-Tree software (Fischbacher, 2007).

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[7]In Table 4 we report a regression where we include additional observations from 64 individuals who took part to a treatments where pretrial negotiations were entirely excluded. The plaintiffs thus made 8 litigation choices in three different experimental conditions and the defendants attempted to guess the choices made by the plaintiffs in each of the 8 periods.
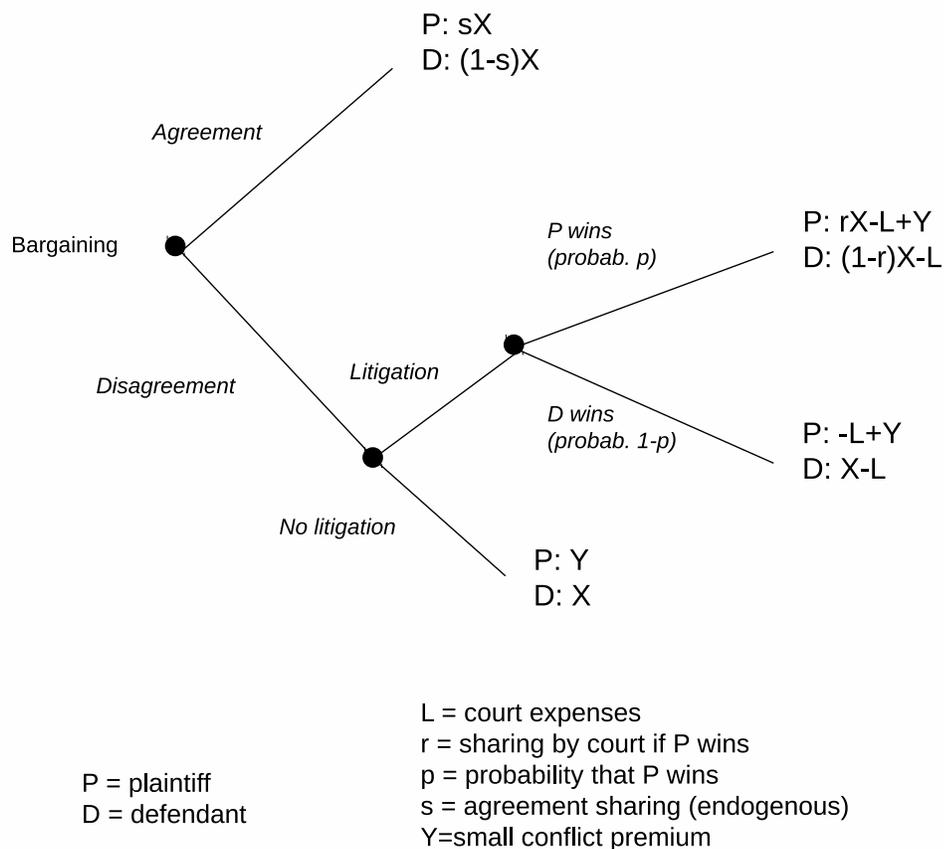
P: sX
D: (1-s)X

Agreement

Bargaining

P wins
(probab. p)

P: rX-L+Y
D: (1-r)X-L

Litigation

Disagreement

D wins
(probab. 1-p)

P: -L+Y
D: X-L

No litigation

P: Y
D: X

L = court expenses
r = sharing by court if P wins
p = probability that P wins
s = agreement sharing (endogenous)
Y=small conflict premium

P = plaintiff
D = defendant

Figure 1: GAME TREE.

At the beginning of each session, participants were seated at visually isolated computer terminals where they received a hardcopy of the German instructions.[8] Subsequently, participants would answer a control questionnaire to ensure their understanding (screenshots of control questions in the appendix). The experiment started after all participants had successfully completed the questionnaire.[9] At the beginning of each session, each subject was assigned one of the two roles, the plaintiff (P) or the defendant (D). These roles correspond to the roles in the setup explained in Section 2.1.

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[8]Instructions, screenshots and further documentation available upon request.

[9]If a participant could not answer a control question, we did not allow her to proceed to the actual experiment until understanding was ensured. By raising a hand, a subject could ask a laboratory operator to come to her cabin and the subject could pose further questions to the operator individually. About 5% of the subjects posed further questions regarding the instructions. The questions helped to clarify the problems in understanding and eventually none of the subjects were excluded from the experiment.

Each experimental session lasted for 8 rounds[10], and the outcome of one round was randomly drawn for the actual payment. Each round consisted of the game described in Figure 1. We used the strategy vector method in eliciting the choices so that each negotiator chose their proposal and the MAO without knowing whether the randomly drawn proposer is the defendant or the plaintiff. The plaintiff chose whether to litigate or not without knowing whether an agreement will be reached at the negotiation stage.[11] The opponent's choices (but not the random draws of nature) were revealed at the end of each repetition of the game. One ECU (experimental currency unit) corresponds to 0.03 euros. Each plaintiff could make losses in any given round including the round randomly drawn for payment. The incurred losses were subtracted of the show-up fee of 3.5 euros which was announced in the opening paragraph of the experimental instructions. Thus the aggregate payment to a subject was never negative. The average earnings were 11.50 euros. The average duration of a session was 1 hour and 20 minutes.

Once the negotiation and litigation choices were elicited, we asked each subject to guess the choices made by the agent on the opposing side. These guesses were incentivized. Each correct guess yielded a supplementary payoff of 11 ECU. A payoff of 1 ECU was subtracted for each unit (ECU) by which the subject misguessed the actual negotiation choice so that missing the actual choice (proposal or acceptance threshold) by 10 units delivered 1 ECU and missing by a larger margin than that gave no supplementary payoff at all. To incentivize the binary litigation choice, we used the proper scoring rule which we discretized to simplify exposition.[12] Each defendant could thus pick one of the following five guesses: that the plaintiff surely litigates (refrains from litigating), that the plaintiff is more likely to litigate (to refrain from litigating), that litigation and refraining from it are equally likely. In the end of the experiment, one of the guesses was randomly drawn for payment from each round but for the round whose negotiation and litigation choices were paid for. Once beliefs were elicited the actual strategy of the opponent was revealed to the subject and she was also reminded of her own strategy. Thus the participants did not learn any population statistics about litigation or negotiation choices nor the outcome of the random outcome of the court ruling between two periods of interaction. This left room for learning only from private experiences. The experiment then proceeded to the following round where each participant was matched with a new subject in the opposing role (perfect strangers) thus removing any repeated game or reputation incentives.

We considered a deterministic and a stochastic court. The deterministic court differs from the stochastic only in that the former implements the expected litigation payoffs of the two

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[10]In one session, there were just 7 rounds due to absence of invited subjects. We dropped one round of play in the benchmark condition in that session.

[11]To keep the design simple and not to overburden the subjects, we chose not to condition the litigation choice on who was assigned the proposer (responder) role in the negotiation stage.

[12]The proper scoring rule is widely used in economic experiments. See Nyarko and Schotter (2002) for an exposition how proper scoring rule can be used in belief elicitation in an economic experiment.

parties with certainty whereas the stochastic court truly implements a random draw using the publicly known probability of winning for the plaintiff (the complementary probability is the winning probability of the defendant). The litigation payoffs are given in Table 1 above.

There were 12 treatments each consisting of three blocks of 2 (*benchmark* condition) or 3 (*low chance* and *high cost* conditions) rounds and of 16 participants playing in a fixed role, once against each of the participants in the opposing role. While in each block the probability of winning and the cost of litigation were fixed, there was variation in these parameters across the blocks as specified in Table 1 below.

$r = 0.4;$ $Y = 10$	*Benchmark* $p = 0.7\ L = 10$	*High cost* $p = 0.7\ L = 58$	*Low chance* $p = 0.1\ L = 10$
risky court *(P win, p)* *(D win, 1-p)*	$\pi_{plain} = 80, \pi_{def} = 110$ $\pi_{plain} = 0, \pi_{def} = 190$	$\pi_{plain} = 32, \pi_{def} = 62$ $\pi_{plain} = -48, \pi_{def} = 142$	$\pi_{plain} = 80, \pi_{def} = 110$ $\pi_{plain} = 0, \pi_{def} = 190$
certain court	$\pi_{plain} = 56, \pi_{def} = 134$	$\pi_{plain} = 8, \pi_{def} = 86$	$\pi_{plain} = 8, \pi_{def} = 182$

Table 1: LITIGATION PAYOFFS ACROSS CONDITIONS.

Having one treatment for each potential order of the three blocks while having alternatively either stochastic or deterministic court, fixed for the entire 8 rounds of a treatment, yields 12 treatments of that were run in May 2008. In February 2010 we ran some additional sessions with blocks starting either with the high cost block or the low chance block. In August 2010 we ran special sessions the design of which is explained in Section 3 and the data of which is only included in the regressions of Table 4.

2.3   Theoretical predictions

Sequential rationality suggests that the proposed and vetoed shares should depend on the expected litigation stage payoffs. The lowest offer the opponent is willing to accept makes her (almost) indifferent between accepting and vetoing it. For a risk-neutral negotiator, it is the share which coincides with her expected payoff from the game ensuing to the litigation stage.[13] Sequentially rational negotiation parties should foresee that litigation undermines the mutual gains from trade and strike an agreement at terms which ensure that rejecting and litigating is suboptimal.

To secure a deal, P must be offered more than her conflict payoff which equals (1) or Y depending on whether it is optimal to litigate or not. Not litigating yields Y for P while D gets X.

As mentioned above, Y is there to slightly perturb the balance to point out some limits of

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[13]Notice that even a risk-averse opponent would accept this offer which is clearly greater than the certainty equivalent of the litigation lottery.

sequential rationality and subgame perfection in empirical work. This additional payoff seems negligibly small relative to the stakes of negotiation to induce any dramatic effects on behavior and it has no impact on the optimality of litigation itself. Yet, theoretically the impact is drastic: conflict becomes the only the rational solution (subgame perfect equilibrium) of the game in the high-cost and low chance conditions.

The introduction of Y has a further benefit: litigation in the high-cost and low chance conditions is our core interest and thus Y has, ex-ante, the desirable effect of inducing marginally more conflict and thus making litigation choices to bear more impact.

In the benchmark condition, the plaintiff's probability of winning is so high and the cost of litigating so low that the optimal (highest expected monetary return) choice calls for litigation by the P. His expected return from litigation (1) exceeds the payoff from not litigating (the endowment Y). In the negotiations stage, a self-interested sequentially rational P should therefore accept all offers weakly greater than his expected return from litigation.

To the contrary, in the low chance of winning case, P's probability of winning is so low that it is suboptimal to litigate. On the other hand, in the high cost of litigation case, the cost is so high that it is again suboptimal to litigate. Recall that the expected return from litigation to P, (1), is equal in the low chance and in the high cost conditions. Thus in the high cost and low chance conditions a rational P should accept all offers exceeding the endowment Y.

In fact in the high-cost and the low chance conditions the unique subgame-perfect equilibrium between risk-neutral self-interested parties predicts conflict: the defendant should never propose a positive amount or accept anything less than 200 since she expects to receive 200 in case of conflict knowing that a rational plaintiff never litigates. Similarly the plaintiff should not propose more than 190 or accept less than 10 since she will receive 10 in case of conflict. Thus subgame perfect equilibrium with self-interest somewhat counter-intuitively predicts that cases never settle and plaintiffs never litigate in the high cost and low chance conditions while cases will always settle and plaintiffs always litigate in the benchmark condition.

PREDICTION 1 *The subgame perfect equilibrium with risk-neutral self-interest makes the following predictions: (1) the plaintiff litigates in the benchmark condition and does not litigate in the high cost and low chance conditions. (2) The disagreement rate is 0% in the benchmark condition and 100% in the high cost and low chance conditions.*

While providing a useful benchmarking role for understanding behavior, the subgame perfect Nash equilibrium turns out too precise and extreme for providing the best fit. Actual behavior always includes noise and decision makers tend to expect this. When plaintiffs tremble in the litigation decisions, the noise has a much more drastic impact on the defendants' incentives in the negotiation table than it has on the plaintiffs' incentives: the defendant's expected conflict payoff falls from 200 to 86 when the plaintiff shifts from not litigating to litigating and the costs are high, the plaintiff's expected payoff falls from 10 to 8. Therefore, the defendants should

react much more to the introduction of trembles making them more cautious and willing to avoid impasse. This argument can be incorporated using the notion of (agent) logit quantal response equilibrium (Kelvey and Palfrey, 1998). In the logit-QRE the choice probabilities reflect rationality in the sense that they are inversely related to the opportunity costs of the choices and the implied choice probabilities are correctly anticipated by the opponents. This relatively small departure from perfect rationality allows us to drastically improve the settlement and litigation rate predictions. This general idea has proved successful in a number of other strategic interaction situations (see Goeree and Holt, 2001, for a particularly illustrative account) but to our knowledge, we are the first to apply it to settlement negotiations.

In the logit quantal-response model, the choice probabilities are proportional to the exponentials of the expected payoffs of the actions given the beliefs on the opponents' behavior. That is, given expectations of i about the action profile, a_{-i}, of other players, $\overline{\sigma}^i_{-i}(a_{-i})$, player i chooses action a_i with probability

$$\sigma_i(a_i) = \frac{exp(1/\mu(\sum_{a_{-i}} \overline{\sigma}^i_{-i}(a_{-i})\pi_i(a_i, a_{-i}))}{\sum_a exp(1/\mu(\sum_{a_{-i}} \overline{\sigma}^i_{-i}(a_{-i})\pi_i(a, a_{-i})} \tag{3}$$

Taking the ratio of choice probabilities of two different actions a'_i and a'_i yields merely

$$\frac{\sigma_i(a'_i)}{\sigma_i(a''_i)} = \frac{exp(1/\mu \sum_{a_{-i}} \overline{\sigma}^i_{-i}(a_{-i})\pi_i(a'_i, a_{-i}))}{exp(1/\mu \sum_{a_{-i}} \overline{\sigma}^i_{-i}(a_{-i})\pi_i(a''_i, a_{-i}))}, \tag{4}$$

and thus the ratio of choice probabilities is proportional to the ratio of exponentials of expected payoffs. In equilibrium expectations and choice probabilities must coincide and thus $\overline{\sigma}^j_i = \sigma_i$ for $j \neq i$. The novel feature is noise which is increasing in μ. As μ tends to zero, the choice probabilities converge to a Nash equilibrium of the game.

For our settlement negotiation game, it is crucial to note that when litigation is suboptimal due to high legal costs, the opportunity cost of litigating is 2 for the plaintiff while it is 114 for the defendant. Equations (3) and (4) imply that letting μ tend towards zero and thus making parties more rational in their choices, the defendant tends to shy away from suboptimal negotiation strategies much faster than the plaintiff abandons litigation. Due to his opponent's trembling litigation hand, the defendant can drastically raise the settlement rate and reduce litigation by increasing the plaintiff's opportunity cost of settlement, i.e. by giving marginally more to the litigant. Thus for instance with $\mu = 13$, in the logit quantal-response equilibrium the defendant is about 3.6 times more likely to propose 10 to the plaintiff than 0, and yet the latter is part of the unique subgame perfect equilibrium path in our setup. The litigation rate conditional on impasse is about 46% in both cases but by increasing the plaintiff's share in the settlement agreement from 0 to 10, the defendant can increase the settlement probability from about 1/3 to about 1/2.

We show in Section 4 that by introducing the logit-quantal-response equilibrium and the associated plausible noise structure into the notion of equilibrium, we can better account for

the behavioral patterns without sacrificing too much on the decision makers' rational striving for their best interest (McKelvey and Palfrey, 1998). We will estimate the noise parameter in Section 4 where it will turn out that the maximum likelyhood estimate is $\mu = 55$. The corresponding predicted litigation and disagreement rates are listed in the prediction below.

PREDICTION 2 *The logit quantal-response equilibrium with risk-neutral self-interest and $\mu = 55$ makes the following predictions: (1) the plaintiff litigation rate is 71% in the benchmark condition and 49% in the high cost and low chance conditions. (2) The disagreement rate is 62% in the benchmark condition while it is 55% and 61% in the high cost and low chance conditions, respectively.*

3 Litigation

3.1 Plaintiff's litigation choices

	Benchmark $p = 0.7\ L = 10$	High cost $p = 0.7\ L = 58$	Low chance $p = 0.1\ L = 10$	Total
RISKY	89%	73%	64%	73%
(early periods)	(87%)	(72%)	(58%)	(68%)
CERTAIN	83%	48 %	48%	56%
(early periods)	(91%)	(48%)	(39%)	(51%)
TOTAL	86%	60%	57%	65%
(early periods)	(89%)	(61%)	(48%)	(59%)

Table 2: Litigation rates pooled over all rounds (in brackets: first two rounds).

The litigation rates across the various treatment conditions are given in Table 2. There are more appeals to court when the legal costs are low and the probability of winning is high ($p = 0.7$ and $L = 10$) than when these parameters are less propitious to litigation ($p = 0.1$ or $L = 58$). These patterns are in line with the comparative statics predictions of self-interested rationality. Yet, our data exhibits an abundance of choices not maximizing expected monetary return. With low costs and high probability of winning, 14% of the subjects do not litigate although they should. With prohibitively high costs, still 60% of the subjects appeal to court while 57% of the subjects litigate when chances of winning are suboptimally low. As illustrated in Section 2, these patterns can be fairly well accommodated within the logit-quantal-response equilibrium framework.

In Table 3, a dummy variable indicating whether the plaintff chose to litigate (1) or not (0) is regressed on treatment variables *HIGH* (high cost), *LOW* (low chance), and *RISK* (risky courts) and their interactions controlling for the period of interaction. The benchline condition in this regression is our benchmark condition ($p = 0.7$, $L = 10$) with certain court rulings. This closer regression analysis shows that there is more litigation in later periods (statistically significant

positive effect of the *Period*-variable) even in conditions where the plaintiff should refrain from litigation (the interaction terms $HIGH \times Period$ and $LOW \times Period$ are insignificant or positive in regressions (5) and (6) in Table 3).[14] The high frequency of litigation when it is not optimal is striking, underlining the behavioral biases that affect the plaintiff's choices.

LITIGATION	(1) logit	(2) logit	(3) GLS	(4) logit	(5) logit	(6) GLS
RISK	0.961***	0.530	0.205***	0.296	0.526	0.0602
	(0.201)	(0.366)	(0.0491)	(0.457)	(0.363)	(0.0421)
HIGH	-1.472***	-1.811***	-0.155***	-1.831***	-1.982***	-0.360***
	(0.212)	(0.283)	(0.0311)	(0.281)	(0.569)	(0.0956)
RISK × HIGH		0.834**	0.168**	0.881**	0.827**	0.255***
		(0.411)	(0.0681)	(0.411)	(0.410)	(0.0655)
LOW	-1.685***	-1.718***	-0.271***	-1.748***	-2.457***	-0.413***
	(0.219)	(0.281)	(0.0535)	(0.280)	(0.531)	(0.0846)
RISK × LOW		0.178	0.0265	0.245	0.202	0.113
		(0.422)	(0.0723)	(0.426)	(0.422)	(0.0695)
Period	0.105***	0.105***	0.0220***	0.0854**	0.0252	0.0184*
	(0.029)	(0.029)	(0.006)	(0.0354)	(0.0712)	(0.00982)
RISK × Period				0.0443		
				(0.0584)		
LOW × Period					0.157*	.0121
					(0.0906)	(0.015)
HIGH × Period					0.0189	-0.00603
					(0.0946)	(0.0160)
Constant	0.892***	1.049***	0.580***	1.157***	1.487***	0.731***
	(0.236)	(0.275)	(0.0508)	(0.288)	(0.467)	(0.0648)
Observations	1,506					

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Litigation regressions, main treatment effects

A more puzzling finding is that there is more litigation in the conditions with uncertain trial outcomes (variable *RISK* in Table 3 and three top panels of Table 2) than in the respective conditions which grant the corresponding expected payoffs for sure (bottom panels). This is particularly true for the high cost condition (variable *RISK × HIGH* in Table 3).

RESULT 1 *Litigation rate is higher when court is risky, especially when costs are high.*

This finding is surprising at first sight. Most theoretical analysis of settlement would assume that agents are risk-averse or risk neutral and thus predict that litigation rate is lower when

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[14]Notice that the incentive to keep up a reputation for being tough on litigation cannot account for this effect since there is no information feed-back about the opponent's choices in previous rounds and in each round each participant is matched with a new opponent. This is the so called perfect strangers design.

trial outcomes are more variant.[15] The above result yet alleges that the majority of plaintiffs, at least, are not risk averse but risk loving.

Three overlapping accounts of this puzzling result suggest themselves. First, people tend to hold illusions of controlling entirely aleatory events and being able to turn them in their favor. This is the conclusion of Langer's (1975) intriguing series of experiments - a conclusion which also has been confirmed in a number of follow up studies. The plaintiffs' such illusions in the random court condition may have strengthened the plaintiff's faith in getting a favorable court ruling. Thompson et al. (1998) even remark, reviewing the accumulated evidence, that contexts where favorable and non-favorable outcomes are salient are particularly likely to conceive illusion of control. The salient monetary payoffs associated with winning and losing in our setup fit well this description. Naturally, to keep check of the illusion, our instructions explicitly emphasized that the outcome draw is a fully computerized random draw. Yet, the literature tells us that the phenomenon stands firm even when odds for winning are explicitly given (Thompson et al. 1998, pp. 147).

Let us consider a second explanation: the prospect theory (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). The literature evinces many cases where risk-loving choice patterns can be attributed to decision makers' perception of facing a prospect of making losses and being willing to take negative expected value bets on reducing those losses. Why then, in our experiment, would the plaintiffs position themselves to a loss frame when litigating? Loewenstein et al. (1989) studied the interplay of risk and other-regarding preference in a hypothetical choice experiment, where subjects self-report their satisfaction with the two parties' monetary outcomes, and found that disadvantageous inequality[16] can be accounted as a loss in the prospect theory sense. If disadvantageous inequality is perceived as a loss in this manner, then the disadvantaged plaintiffs will litigate more the riskier the court rulings. The implications for settlement patterns could be dramatic: riskiness of court outcomes could increase inefficient litigation, not to reduce it as suggested by risk aversion. [17]

A third explanation for the high litigation rate with risky courts also relates to Kahnemann and Tversky's prospect theory which holds that small-probability events are overweighted in human estimation of the likelihood of uncertain events. Thus in our experimental condition where the winning probability is low, 10 %, the winning event might receive a higher weight in subjects' minds making the prospect of litigation look overly favorable. Guthrie (2000) building on the work of Rachlinski (1996) discusses in depth the interplay of overweighting and loss aversion in litigation contexts. He extends Rachlinski's experimental analysis to contexts of

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[15]Prescriptive rational settlement negotiation theory advocates that greater riskiness in court decisions would induce more precaution. For a review, see Hay and Spier (1998), for instance.

[16]See also Fehr and Schmidt, 1999.

[17]In addition to social comparison, high loss references may be driven by high aspirations set at the negotiation table (Korobkin, 2002), for instance.

hypothetical frivolous litigation where the chances of winning (or losing) are small but paid damages are substantial: in line with the prediction of prospect theory, the small probability contexts reverse the risky choice patterns implied by mere loss aversion so that choices appear risk-loving (risk-averse) in the gains domain (loss domain) when probability of winning (losing) is small.

Let us discuss how evidence fits each of these explanations in turn. First considering the third explanation, the low winning probability should be overweighted when evaluating the lottery. The winning-outcome in the aleatory condition with low winning probability, $p = 0.1$ and $L = 10$, may thus yield a disproportionate weight and this should increase the likelihood of litigation. The same effect should be absent or weaker in the high cost condition, $p = 0.7$ and $L = 58$, since the chances of winning and losing are more equal. In fact the probability of losing is smaller than that of winning and should thus be given a disproportionate weight if any. In conclusion, probability overweighting predicts a negative interaction effect between riskiness and costliness of court rulings when comparing the high cost condition against the low chance condition (where the expected monetary payoffs for the plaintiff are the same) excluding data from the benchmark condition.[18] Since we find a positive association between risk and expenses at court, our data rejects probability overweighting as an explanation for the higher litigation rate under risky courts.

As for the first explanation, illusion of control also suggests that there should be more litigation when courts are aleatory: only when court outcomes are random can subjects hold illusion of controlling the draw. But it does not predict a discriminatory effect between the low chance and high cost conditions, or if it does it predicts a stronger effect in the low chance condition where the gains are more vivid than in the high cost condition.[19] Thus we can also rule out illusion of control as an explanation for our litigation patterns.

The second explanation, loss aversion in social comparison, predicts a positive interaction effect of risk and legal costs on litigation. Let us elaborate the argument in more detail. When court outcomes are certain, each side of the dispute is allocated her expected payoff in the corresponding random court condition for sure. The (expected) payoff of 8 ECU to the plaintiff is identical in the high cost and low chance conditions.[20] The conditions differ in how much the court ruling allocates to the defendant (in expected terms): 182 in the low chance condition and 86 in the high cost condition. The expected payoff for the plaintiff being smaller than 10 which the plaintiff guarantees by not litigating, a rational plaintiff only interested in maximizing her payoff would never litigate. Yet, the intrinsic other-regarding preference theories suggest that the plaintiff might prefer litigating in order to render payoffs more equal, especially when such

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[18]Notice yet, that our setup does not allow us to rule out that frivolous litigation would not matter in contexts where the probability of winning is smaller than 10%.

[19]Alloy and Abramson (1979) or Dunn and Wilson (1990) for the vividness argument in illusion of control.

[20]See the section on experimental setup and Table 1.

equalizing punishment is effective[21] as in our high cost condition.

When court rulings are stochastic, they only have an effect on the expected equity of payoffs. While there is a chance that payoffs are much more equal than when outcomes are certain (70% chance of yielding 32 for the plaintiff and 62 for the defendant in the high cost scenario; 10% chance of 70 for the plaintiff and 110 for the defendant in the low chance scenario) there is also a chance of losing big time (in the high cost scenario a 30%-chance of losing 48 while the defendant wins 142; in the low probability scenario a 90%-chance of getting nothing while the defendant receives 190). Yet, prospect theory holds that a plaintiff experiencing her payoff disadvantage as a loss is willing to take negative expected value bets on reducing inequality, in line with our finding that there is more litigation under risky court.

This prediction runs counter to the findings of Bolton et al. (2005) whose experimental data illustrate that although expected equality also matters for people, it is less influential than when equality can be generated with certainty. [22] Also if people tend to be risk averse (see Holt and Laury, 2002, for instance), one would expect that the litigation rate is lower when court rulings are stochastic. We find the exact opposite: there is *more* litigation in the conditions where trial outcomes are stochastic.

RESULT 2 *The data supports loss aversion with social comparison as an explanation for the high litigation rate in risky high-cost condition. Illusion of control and overweighting of probability are rejected as explanations for the higher litigation rate when courts are risky.*

We ran additional sessions where only litigation decisions were made and there were no pretrial negotiations. We did this in order to exclude any spillover effects of negotiation choices on litigation choices. In Table 4, we report the results of a logit and a linear panel regression clustering the standard errors of each individual subject. The comparison in the regression is between the high cost condition and the low winning probability condition where expected payoffs for the litigant are identical (thus benchmark condition data, $L = 10$ and $p = 0.7$, are excluded). The litigation choice is regressed on treatment variables (excluding the benchmark condition) where the pretrial dummy-variable takes value zero for the additional sessions without negotiations.

When court rulings are aleatory, the litigation rates in the high cost and the low chance conditions fall drastically apart unlike in the deterministic case. The fact that litigation rates

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[21] See Camerer (2003), for instance.

[22] They study subjects in simplified ultimatum games where the pie can only be shared in two asymmetric ways: 80% for proposer and 20% for responder or 20% for proposer and 80% for responder. They found that subjects were more willing to reject proposals favoring the proposer if the proposer had an alternative option to propose a lottery over the same unequal outcomes but with equal expected payoffs. The responder could decide whether to reject or accept that lottery without knowing its realization. Rejection led to zero payoffs for each side with certainty. Yet, the rejection rate of the proposal favorable to the proposer was even higher when there was a sure fifty-fifty split alternative available.

LITIGATION	(1) Logit	(2) GLS
RISK	1.048*	0.303**
	(0.632)	(0.119)
HIGH	-.710	-0.0573
	(0.620)	(0.0903)
RISK × HIGH	1.901**	0.336**
	(0.838)	(0.148)
Pretrial	0.889*	0.296***
	(0.530)	(0.0777)
RISK × Pretrial	-0.380	-0.152
	(0.689)	(0.136)
HIGH × Pretrial	0.714	0.0490
	(0.636)	(0.0977)
RISK × HIGH × Pretrial	-1.472	-0.227
	(0.899)	(0.165)
Period	0.105***	0.0207***
	(0.0337)	(0.00741)
Constant	-1.424***	0.103
	(0.499)	(0.0712)
Observations	1,140	1,134

Robust standard errors in parentheses

*** p< 0.01, ** p< 0.05, * p< 0.1

Table 4: LITIGATION REGRESSIONS, COMPARISION OF LOW CHANCE AND HIGH COST TREATMENTS

differ significantly when trial outcomes are risky but not when they are certain in the high cost case, clearly advocates that there is an interaction effect between other-regarding and risk attitudes. The positive interaction effect speaks in favor of the second explanation: disadvantageous inequality is perceived as a loss and high costs generate more equal payoffs thus inducing loss averse subjects to take the negative expected return bet in the hope of substantially reducing the inequality.

There are some further results of interest. First, litigation tends to be more prevalent when done in the context with pretrial negotiations (the positive coefficient of the pretrial variable). This may reflect negative reciprocation of failures to agree which are attributed to the opponent (see Cox et al., 2007 and the references therein, for instance). Ho and Liu (2011) conduct an intriguing empirical study on how apologies can help to reduce anger related to attribution of negative outcomes to physicians and thus reduce litigation rates by patients in medical malpractice cases. Second, there also tends to be more litigation at the later periods, which is surprising since litigation is suboptimal according to self-interested rationality in all the conditions included in these regressions, and a standard learning argument would thus suggest less litigation in later periods.

RESULT 3 & 4 *Litigation is more prevalent in sessions with pretrial negotiations than*

without. There is more litigation in later periods.

3.2 Expectations about litigation

For the sake of understanding conflict in strategic interaction, it is crucial to understand to which extent parties have correct expectations about each other's choices. Incorrect expectations are likely to induce miscoordination and amplify conflict (Babcock and Lowenstein, 1997). Table 5 below studies the extent to which defendants expect litigation across treatment conditions to differ and how expectations are adjusted from one period to another. In the first four regressions we use linear panel regression clustering individual standard errors. The fifth regression is a corresponding ordered logit-regression.

Guess Litigation	(1) GLS	(2) GLS	(3) GLS	(4) GLS	(5) ord.logit
RISK	0.325***	0.0355	-0.188	-0.156	-0.729**
	(0.111)	(0.272)	(0.322)	(0.188)	(0.355)
Period	-0.0104	-0.0576**	-0.0634**	-0.0337	-0.107***
	(0.0182)	(0.0271)	(0.0247)	(0.0310)	(0.041)
RISK×Period		0.0803**	0.0981***	0.0779***	0.180***
		(0.0375)	(0.0363)	(0.0294)	(0.056)
HIGH	-0.624***	-0.527***	-0.884***	-0.606**	-1.375***
	(0.0974)	(0.116)	(0.167)	(0.241)	(0.254)
HIGH×RISK			0.522**	0.366*	0.788**
			(0.206)	(0.188)	(0.313)
HIGH×Period				-0.0445	
				(0.0416)	
LOW	-0.561***	-0.434***	-0.658***	-0.619**	-1.005***
	(0.108)	(0.118)	(0.189)	(0.249)	(0.277)
LOW×RISK			0.184	0.0191	0.293
			(0.240)	(0.213)	(0.345)
LOW×Period				0.0122	
				(0.0423)	
Constant	3.683***	3.660***	3.886***	3.845***	-
	(0.122)	(0.208)	(0.214)	(0.182)	-
Observations	1,250	1,250	1,250	1,250	
Number of id	158	158	158	158	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Beliefs on litigation

The defendants have fairly correct expectations about the signs of treatment effects and they even correctly expect more litigation in the aleatory high cost case than in the corresponding deterministic condition (significant positive coefficient of *HIGH × RISK* in regressions (3) and

(4)).[23] Misguided expectations about the litigation rates can thus fairly reliably be excluded as an explanation of conflict at the negotiation stage, the issue to be studied in further detail in the follow-up section.

RESULT 5 *The plaintiffs expectations about the litigation rate are not erroneous.*

4   Negotiations

Let us now turn our interest to how settlements are reconciled or how disagreement arises. Table 6 below reports the disagreement rates in our six different experimental conditions.[24] It

	Benchmark $p = 0.7 \ L = 10$	High cost $p = 0.7 \ L = 58$	Low chance $p = 0.1 \ L = 10$	Total
risky court	51%	38%	47%	45%
(early periods)	(57%)	(42%)	(63%)	(53%)
certain court	55%	37%	50%	46%
(early periods)	(48%)	(41%)	(39%)	(41%)
Total	53%	37%	49%	45%
(early)	(52%)	(41%)	(50%)	(47%)
logit-QRE with $\mu = 55$	62%	55%	61%	-
Perfect Nash	0%	100%	100%	-

Table 6: Disagreement rates and theoretical predictions, pooled over all rounds (in brackets: first two rounds).

is straightforward to notice that subgame perfect Nash equilibrium fails to account for these patterns. As explained in Section 2, the subgame perfect equilibrium disagreement rate is 0% in the benchmark condition where litigation is optimal and 100% in the high cost and low chance conditions where no litigation should occur. We do not observe such extreme disagreement rates and moreover even the empirical comparative statics are against the subgame perfect equilibrium prediction: there is more disagreement in the benchmark condition than in the high cost condition and not vice versa as predicted by subgame perfection.

The logit-QRE makes better predictions and even captures the comparative statics between benchmark, high cost, and low chance conditions. Remarkably, the logit-QRE correctly predicts that settlement rate is approximately equal in the low chance and the benchmark condition while the settlement rate in the high cost condition is higher.

We employ maximum likelihood estimation to yield an estimate for μ (See Section 2.3). We first classify offers (responses) into 21 coarse classes rounding offers 0-9 to 0 (responses

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[23]Of course these comparisons tell us little about whether defendants have correct point estimates about the average litigation rate.

[24]Recall that there are eight games played, each time against a different opponent and with private feed-back to rule out dynamic reputation and punishment incentives.

= minimum acceptaple offers = MAOs 1-10 to 10), offers 10-19 to 10 (MAOs 11-20 to 20) and so forth so that offers labeled as k are all compatible with MAOs labelled as k and use this coarsened empirical distribution of offers and responses to calculate the log-likelihood of the profile of choices given the value of parameter μ.[25] The corresponding choice probabilities predicted by the model constitute the unique solution of the system of equations (4). The maximum-likelihood μ estimate thus received is $\mu^* \approx 55$. The corresponding disagreement rates and the associated empirical frequencies are given in Table 6.[26] The logit-QRE with $\mu = 55$ which gives the best fit with the data asserts that disagreement rate should be lower in the high cost treatment than in the other two. This prediction is borne out by data.

RESULT 6 *The best-fitting logit-QRE correctly predicts that settlement rate is significantly higher in the high cost condition than in the other two. The subgame-perfect equilibrium fails to predict these empirical comparative statics.*

In the logit-QRE the choice probabilities reflect rationality in the sense that they are inversely related to the opportunity costs of the choices and the implied choice probabilities are correctly anticipated by the opponents. When plaintiffs tremble in the litigation decisions and costs are high, the noise has a much more drastic impact on the defendants' incentives in the negotiation table than it has on the plaintiffs' incentives: the defendant's expected conflict payoff falls from 200 to 86 when the plaintiff shifts from not litigating to litigating, the plaintiff's expected payoff falls from 10 to 8. Therefore, the defendants should react much more to the introduction of trembles making them more cautious and willing to avoid impasse. In the low chance condition, the defendant's expected conflict payoff is 200 when the plaintiff does not litigate and 182 if the plaintiff does: the defendant's opportunity cost is fairly low and thus logit-QRE predicts fairly aggressive bargaining behavior by the defendants reflected in the high disagreement rate. Another way to gain insight how opportunity costs influence the joint incentives of the parties is to notice that the sum of expected conflict payoffs when the plaintiff litigates is 96 in the high cost condition while it is 190 in the other two. The joint opportunity cost is considerably higher in the high cost condition. Thus logit-QRE predicts that there should be less aggressive bargaining behavior and less conflict in the high cost condition.

Notice that the differences in disagreement rates between risky and certain courts in the early rounds are not explained by neither the subgame perfect nor the logit-QRE. To further study

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[25]See Costa-Gomes and Zauner (2001) The coarsening is needed to facilitate the numerical calculation of the equilibrium choice probabilities and their estimation.

[26]Regarding litigation, both the perfect Nash equilibrium and the logit-QRE correctly predict that there is more litigation in the benchmark condition than in the high cost and low chance conditions. The logit-QRE is the more accurate of the two predicting a 71% (actually 86%) litigation rate in the benchmark condition and a 49% in the other two conditions (actually 60% in the high cost condition and 57% in the low chance condition) where it is suboptimal to litigate.

this issue, we run a panel regression analysis. In Table 7 below, a dummy variable indicating disagreement is regressed on treatment variables controlling for the period of play and allowing for interactions between treatments and period. The (certain) high cost condition, given its lowest disagreement rate, is used as the benchline against which the other conditions (LOW, $BENCH$, $RISK$ and their interactions) are compared to. Indeed, there is indication that the high cost condition is less prone to conflict than the other two. More detailed analysis shows that initially it is particularly the risky courts where the plaintiff has a low chance of winning ($RISK \times LOW$) which are significantly more prone to conflict. The gap in the settlement rate between the risky and the certain case narrows down over time as there is more conflict in later periods in the certain case ($LOW \times Period$) and less in the risky case ($RISK \times LOW \times Period$).

Disagreement	(1)	(2)	(3)
RISK	-0.0592	0.0548	-0.218
	(0.162)	(0.206)	(0.428)
BENCH	0.658***	0.766***	0.487
	(0.160)	(0.212)	(0.541)
		(0.307)	
RISK×BENCH		-0.215	0.350
		(0.307)	(0.771)
Period	-0.020	-0.020	-0.0846
	(0.0262)	(0.0262)	(0.0619)
RISK×Period			0.0663
			(0.0893)
BENCH×Period			0.0673
			(0.104)
RISK×BENCH×Period			-0.121
			(0.150)
LOW	0.459***	0.537***	-0.467
	(0.131)	(0.201)	(0.441)
RISK×LOW		-0.157	1.291**
		(0.262)	(0.611)
LOW×Period			0.240***
			(0.0928)
RISK×LOW×Period			-0.347***
			(0.133)
Constant	-0.406**	-0.463***	-0.196
	(0.163)	(0.174)	(0.298)
Observations	1,250	1,250	1,250

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses

Table 7: DISAGREEMENT RATE REGRESSIONS, LOGIT

Given the interesting differential patterns in the litigation rates when comparing the high cost condition to the low chance condition (Table 4), we ran specified regressions to analyze how these litigation patterns are reflected in the settlement rate. In Table 8, the disagreement dummy is regressed in a manner similar to the regression of Table 4. The high cost condition is compared against the low chance condition including interactions with the riskiness of court rulings and with experience. Data from the benchmark condition, $p = 0.7$ and $L = 10$, are excluded. The regression reveals interesting patterns: in early rounds risky courts with low plaintiff-winning probability are particularly prone to conflict ($RISK$). Yet, risk has the reverse impact on disagreement when costs are high ($RISK \times HIGH$). Recall that this latter is exactly the condition where litigation rates were significantly higher. Thus the higher settlement rate seems driven by more cautious bargaining behavior by both sides, each willing to avoid the implied high litigation costs.

RESULT 7 *Risky courts induce more disagreement when the plaintiffs have low chance of winning and less disagreement when legal costs are high.*

The latter finding is in line with expected utility with risk-aversion and with the experimental findings of Ashenfelter et al. (1992) who found that (commonly known) more erratic arbitration increases the settlement rate. Yet, the first finding stands in contrast to this prediction. Ashenfelter et al. (1992) studied effects of *forced arbitration* if failing to agree. In our setup, arbitration is costly and an option chosen by the plaintiff thus leaving room for mistaken beliefs about opponent behavior. The result cannot be construed by alternative solution concepts either.

The significance of the *Period*-variable and its interactions suggest dynamic patterns. The high cost condition becomes more prone to conflict over time when risky and less prone to conflict when certain. In the low chance case the dynamic effect of risk is the opposite: less conflict over time with risky, more conflict over time with certain court.

RESULT 8 *When the plaintiffs have low chance of winning, there is less conflict over time with risky and more conflict over time with certain courts. When legal costs are high, there is more conflict over time with risky and less conflict over time with certain courts.*

The initial gap in disagreement rates between the risky and certain courts in both the high cost and the low chance condition narrows down over time.

	Disagreement
RISK	1.073**
	(0.440)
HIGH	0.467
	(0.441)
RISK×HIGH	-1.291**
	(0.611)
Period	0.155**
	(0.0706)
RISK×Period	-0.280***
	(0.0943)
HIGH×Period	-0.240***
	(0.0928)
RISK×HIGH×Period	0.347***
	(0.133)
Constant	-0.663**
	(0.334)
Observations	948

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Disagreement rate, "High cost" vs "low chance"

5 Conclusion

We study settlement negotiations and the plaintiff's decisions to raise a lawsuit after failed settlement in an incentivized non-framed laboratory experiment.[27] In line with subgame-perfect equilibrium, litigation rates are higher when it is optimal to litigate than when not. Yet, contrary to the predictions of risk-aversion, we find that litigation rates are higher when court rulings are uncertain rather than certain.

There are three explanations to this finding: (i) illusion of control, (ii) loss aversion with social comparison, (iii) overweighting of small probabilities. We find evidence favoring the second explanation: the plaintiff's expected payoff falls short of that of the defendant; the risky court yet provides with a lottery for narrowing the gap. Our incentivized behavioral results are in line with the findings of Loewenstein et al. (1989) in a hypothetical negotiation setting.

Recently an interest has emerged for studying how social comparison influences risk taking. The present study differs from other contributions in this emerging literature in that all court lottery outcomes place the plaintiff strictly in the disadvantage domain and yet there is variation in the defendant's payoff also. In other studies, the decision maker could end up being ahead

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[27]The sequential interactive task is relatively cognitively demanding. Incentives have been shown to reduce variance and improve performance in cognitively demanding tasks (Camerer and Hogarth, 1999). Thus the use of incentives is recommendable in our setting.

in some outcomes, and behind in some others (Brennan et al. 2008, Bault et al. 2008, for instance); or the protagonist's payoff was held constant whenever the decision maker fell short of the protagonist's payoff in all outcomes (Linde and Sonnemans, 2012). In the present study, the plaintiff has a choice between receiving a sure sucker payoff or gambling for more equality at the cost of reducing both player's expected payoffs. In contrast to the present paper Linde and Sonnemans (2012) find evidence for risk aversion in the loss domain. Yet, in none of the lottery pairs they study a disadvantaged decision maker can choose to generate more expected equality at a cost for *both* parties. Our finding gives further support to the conclusion of Linde and Sonnemans (2012) that the topic deserves further study since simple extensions of either the prospect theory or inequity aversion models fail to capture many stable patterns in behavior.

Notice that in a contextually richer framework, a higher litigation rate under variant decrees could be driven by willingness to delegate the moral judgement to the impartial court. Such "shifting the blame"-argument has been suggested in a general context by Bartling and Fishbacher (2011) and it might be particularly important in the legal context where the court is perceived to have a moral authority. Yet in our non-framed laboratory study the effect should be smaller.

When it comes to the negotiation strategies, impasses are frequent in the initial rounds particularly when courts are risky and the plaintiff has scant chances of winning. The negotiation conflict seems to be driven by the lower opportunity cost of conflict for the defendants which makes them more aggressive in the low chance condition. An intriguing finding is that in the high cost condition where the sum of opportunity costs is high, the settlement rate is much higher than in the other two. Keeping check of private incentives to litigate can be achieved in two alternative ways, either by raising the costs of going to court or by lowering the chances of winning the case. Our study illustrates how psychological factors and error imply that the two are not perfect substitutes in reducing litigation or increasing settlement rate. The fact that the plaintiffs err in their litigation choices implies that the defendants must be particularly cautious in the settlement stage when legal costs are high. Lowering the odds of winning for the plaintiffs have the opposite incentive effect: the defendants' opportunity cost of settlement is lower and thus they are considerably less cautious in the negotiation table. Thus higher legal costs imply considerably higher settlement rate. Yet one should note that when risk-spread in court rulings increases, the plaintiffs tend to be more willing litigate, though less demanding in the bargaining table. Thus the introduction of risk might have a surprising impact on the balance of agreements outside the court and thus cause an unexpected distributional effect.

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