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Gambling for the upper hand: Settlement negotiations in the lab

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Gambling for the Upper Hand – Settlement Negotiations in the Lab

by

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Gambling for the Upper Hand - Settlement Negotiations in the Lab[1]

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We exploit a controlled frameless 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 and lowers the settlement rate. This latter finding goes against the received wisdom and earlier experimental evidence (Ashenfelter et al. 1992) that greater risk in arbitration outcomes increases the settlement rate. We find that self-serving biases about the protagonist's course of action are accountable for the lower settlement rate, while an impasse payoff inferior to that of the defendant induces the plaintiffs to excessive risk-taking in an attempt to narrow the gap.

KEYWORDS: bargaining; litigation; loss aversion; self-serving bias; settlement
JEL CODES: C72, C9, K41

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1. INTRODUCTION

"A final reason for the failure to develop a theory adequate to handle the problem of harmful effects stems from a faulty concept of a factor of production. ...We may speak of a person owning land and using it as a factor of production but what the landowner in fact possesses is the right to carry out a circumscribed list of actions. ...This does not come about simply because of government regulation. It would be equally true under the common law. In fact it would be true under any system of law. A system in which the rights of individuals were unlimited would be one in which there were no rights to acquire." Coase (1960).

Ronald Coase argued that well-defined property rights are the ultimate factors of production and as such the corner-stone of a well-functioning market economy. Property rights are safeguarded by courts. In fact one can argue that a violation of a property right can be defined as an act of depriving the owner from the benefits of her property beyond of what she can guarantee herself, in expected utility terms, by appealing to court.

When the expected value of the risky court ruling to each side of the dispute is common knowledge, and there are no other costs to transacting, then the property rights are well defined and bilateral negotiations among rational parties not only ensure that legal disputes will settle out of court without costs, but also, as argued by Coase, that markets will guarantee an efficient allocation of those rights. Yet, US courts provide abundant evidence of lost settlement opportunities. In year 2000 alone, 20.1 million cases were filed in state courts. Though most of the cases were settled and only 3-4 % ended up in trial (Ostrom et al., 2001), this still leaves courts and judges with a work-load of almost a million cases yearly.

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. Early theoretical pioneering 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. Some other psychologically founded factors such as risk and other-regarding preferences are less well understood.

In an attempt to narrow this gap we study the effect of dispersion in trial outcomes on settlement and litigation in a non-framed, anonymous computerized experiment. If the psychological biases bear influence in such an abstract setting, one would expect them to continue to do so in field experimental settings with stronger contextual cues and face-to-face interaction. 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,[2] there

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

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.[3] It is particularly difficult to find unbiased data with natural independent variation in dispersion of court decrees. Emerging democracies, for instance, might have greater dispersion in adjudications but they also differ in many other key aspects from traditional democracies 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. The decision to litigate results in a computerized court ruling of the dispute with an exogenous and publicly known probability of winning and losing, and equally large publicly 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 plaintiff's expected payoff 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 clearly goes against the prediction of risk-aversion. Our evidence suggests that this excessive risk-taking might be due to social comparison: falling short of the defendant's payoff induces the plaintiffs to take negative expected return bets to narrow this gap (Kahneman and Tversky, 1979; Loewenstein et al., 1989).

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.[5] Yet, we also find that variant decrees induce more disagreement, and particularly so when the plaintiffs have scant chances of winning. This 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.

Contrary to our results, Ashenfelter et al. (1992) found that (commonly known) more erratic arbitration increases the settlement rate. They studied effects of *forced arbitration* if failing to agree. In our setup, arbitration is costly and an option chosen by the plaintiff. The added disagreement rate in our treatment with uncertain trials seems to stem from the mistaken beliefs about the effect of risk on behavior. The beliefs we elicit indicate that the defendants expect risk to inhibit court appeals. This mistaken belief is the likely driver of the defendants' more aggressive bargaining behavior that we observe: the median defendant is rejective to the equal split in the risky court where the odds are against the plaintiffs. This pattern is something that plaintiffs in their turn fail to expect: they expect the modal equal split offer to be rather accepted. It is worth noticing that in our case the conflict-generating biased conjectures concern the protagonist's undertakings during the dispute, not the court rulings as in the studies reviewed by Babcock and Loewenstein (1997).

These findings raise juridical policy concerns. Somewhat counter-intuitively and in opposition to what Ashenfelter et al. (1992) experiment advocates, finding ways of reducing uncertainty regarding court outcomes could reduce the number of filed

[3] 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.

[4] Thus our study reflects the American rule, see Plott (1987) and Coughlan and Plott (1997) for an experimental comparison of the English and American rules of attribution of legal expenses.

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

lawsuits, not to increase them as predicted by risk-aversion. Our results and those reviewed in Babcock and Loewenstein (1997) suggest that moderation of risk might have three beneficial effects. First and directly, our evidence alludes that the plaintiffs are less inclined to litigate when there is less dispersion in the trial outcomes. Second, we find little evidence for conflict-inducing self-serving biases about the opponent's course of action when court rulings are certain. Third, less uncertainty about decrees leaves less room for drastically incompatible views about the likely sentences. Although this channel was shut off in our experiment, such self-serving biases in beliefs have been found to induce conflict in other dispute experiments (Babcock and Loewenstein, 1997). In addition to these effects, dissolving uncertainty has further benefits in making property rights themselves subject to less uncertainty thus potentially facilitating their trade.

Kahneman and Tversky's prospect theory (1979, 1992) has been widely applied to study settlement negotiations.[6] While there are few controlled computerized and incentivized laboratory experiments,[7] there is a number of other inspiring theoretical and empirical work. Rachlinski's (1996) pioneering account of the influence of reference points on litigation suggests that plaintiffs should be risk-averse in negotiating a settlement since for them settlement may only generate extra income; defendants should be risk-loving in the face of potential losses. In line with Rachlinski's conjecture, we find that plaintiffs are willing to accept lower offers when courts are risky while the opposite holds true for the defendants. Yet, the plaintiffs' litigation behavior in the risky court case is more aggressive and risk-seeking. This leaves a puzzle over whether prospect theory provides an exhaustive account of patterns observed in this experiment and in those carried out by Rachlinski. Since risk preference patterns during and after negotiations seem different, our finding can be seen supporting Korobkin's (2002) view of that bargaining aspirations impact reference levels in risky choice.

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. Section 5 explores further why risk-seeking patterns emerge in litigation. Section 6 is devoted to the discussion of the Rachlinski conjecture. We draw conclusions in Section 7.

2. THEORETICAL BACKGROUND AND EXPERIMENTAL DESIGN

2.1. Framework

In this section we present a stylized model of settlement negotiations with litigation possibility. 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

[6] Guthrie (2003) reviews the behavioral law and economics literature. Korobkin (2002) points out that there is a gap between negotiation consultant's emphasis of the importance of aspirations and the lack of substantive theories of the influence of these latter on negotiation outcomes. He suggests among other things that setting aspirations might matter exactly because they influence the way negotiators perceive gains and losses and thus their willingness to incur risks. Korobkin also provides non-incentived supporting evidence.

[7] Notable exceptions, though not directly studying prospect theory, include Coursey and Stanley (1988) and Coughlan and Plott (1997) studies of English and American rules of allocating expenses, Tor et al. (2010) study of defendants willingness to accept plea offers. McAdams (2000) and Camerer and Talley (2007) revivew some of the literature.

break, the plaintiff will have a possibility to sue the other 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 a potential infringer of the patent rights, and the court imposed profit share corresponds to damages paid to the plaintiff by the defendant. 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 proba(bility)* of the P victory.

Generally bargaining can be assumed to implement the Nash bargaining solution. If the parties reach an ex ante agreement (prior to litigation), they share the value X so that the P gets the share sX and the D gets $(1-s)X$. If the parties fail to reach an ex ante agreement, then the P chooses whether to litigate or not. Litigation is costly, as both parties incur litigation costs L. We assume that both parties pay their own litigation costs irrespective of the court outcome (i.e. American legal system). There are two alternative litigation cost conditions in the experiment $L = 10$ and $L = 58$ where the latter holds in the so called *high cost* of litigation condition.

If the P wins the court case, he receives damages total of rX, where $r \in (0, 1)$ is the court imposed profit share. In the experiment we set the P's profits share equal to $2/5$.

In addition, the P is given an endowment $Y = 10$, which he gets in the case where no ex ante agreement is reached. Y compensates the experiment subjects so that they do not end up paying for the participation. The endowment Y neither influences the optimality of litigation nor the comparative statics predictions across treatment conditions. In the experiment we set $Y = 10$.

The timing and the payoffs of the bargaining game are illustrated in Figure 1 below.

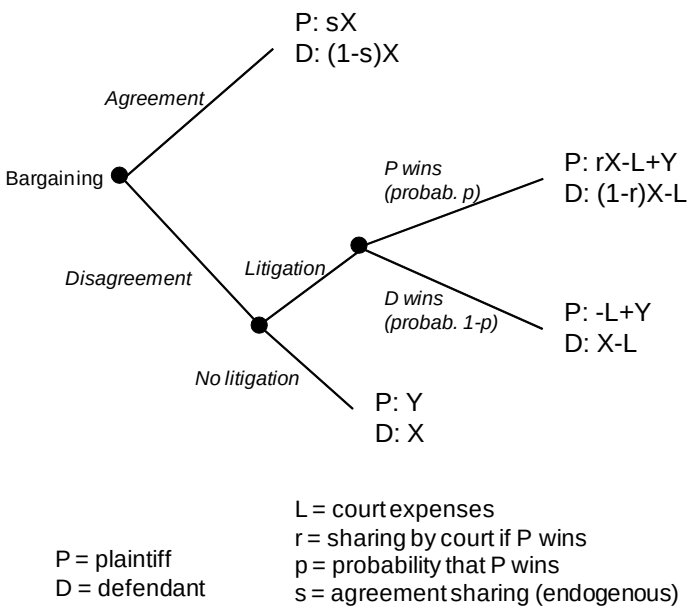

FIGURE 1: Model of pre-trial negotiations and litigation

2.2. Solving for the equilibrium

Assuming common knowledge of sequential rationality, the game is solved by backward induction. If the P decides to litigate, then the expected payoff for the P is

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

and the expected payoff for the D is

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

Not litigating yields Y for the P. If litigation is profitable for the P in expected terms, i.e. $prX > L$, then the threat points in the ex ante Nash bargaining are the expected payoffs when the P litigates, (1) and (2) for P and D, respectively.

An ex ante agreement saves on the litigation costs $2L$ while the impasse endowment of P, Y, is lost. Thus $2L - Y$ constitutes the gains from trade from ex ante licensing the patent.[8]

In the Nash bargaining equilibrium, each player gets his threat point value and a share of the gains from trade. Thus, if β is the bargaining power of the P, his bargaining payoff is

$$prX + (1 - \beta)\, Y - (1 - 2\beta)\, L$$

and the D's bargaining payoff is

$$(1 - pr)\, X - (1 - \beta)\, Y + (1 - 2\beta)\, L.$$

The bargaining payoffs determine the equilibrium sharing in the ex ante agreement

$$\begin{aligned} s^* X &= prX + (1 - \beta)\, Y - (1 - 2\beta)\, L \\ s^* &= pr + (1 - \beta)\, \frac{Y}{X} - (1 - 2\beta)\, \frac{L}{X} \end{aligned}$$

In the experiment, negotiations take a specific 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 with probability 50%. In this special case of ultimatum bargaining, bargaining weight is either $\beta = 0$ or $\beta = 1$ in the cases where the D and the P are to make the take-it-or-leave-it offer, respectively. In each contingency, one of the parties has all bargaining power. A self-interested sequentially rational players should accept all offers weakly greater than this equilibrium offer. These proposals and responses constitute our self-interested sequential rationality predictions resumed in Table 1 below.

The comparative statics of the prediction are easily derived. The P's equilibrium share s^* is increasing in p and r, and if his bargaining power $\beta > \frac{1}{2}$, s^* is also increasing L.

[8] The combined profit from an agreement is $sX + (1 + s)\, X = X = 200$, and the combined value of the threat points is $prX + Y - L + (1 - pr)\, X - L = X + Y - 2L = 210 - 2L$, which give the gains from trade $X - (X + Y - 2L) = 2L - Y = 2L - 10$.

2.3. 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, 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).

At the beginning of each session, participants were seated at visually isolated computer terminals where they received a hardcopy of the German instructions[9]. Subsequently, participants would answer a control questionnaire to ensure their understanding. The experiment started after all participants had successfully completed the questionnaire. 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 theoretical setup explained in Section 2.1.

Each experimental session lasted for 8 rounds, the average duration of a session was 1 hour and 20 minutes. The average earnings were 11.50 euros. Each round consisted of two stages as in the theoretical setting described in Section 2. In the first stage the matched parties would engage in bargaining a settlement. To gain as much data and understanding of their tactics and yet to keep the setting relatively simple, we implemented the following random proposer ultimatum game. Each party simultaneously chose a proposed sharing of the 200 ECUs[10] between the two parties. At the same time each party also chose her/his minimum share proposed that she/he would at least require to have in order to accept the proposed sharing. Once each side had made these choices, one of the proposals was randomly drawn with probability 50% and the opposing side's minimum share would be compared to the proposed share. If the share was larger or equal, then the proposal was accepted and each would receive her/his proposed share. If the share was smaller, then the proposal was rejected and the second stage litigation choice, which the subject in the role of the plaintiff had chosen simultaneously with her proposal and her minimum acceptable share, was implemented. Thus depending on whether or not the subject in the plaintiff role chose to litigate, a failure to agree led to a computerized court ruling or to the implementation of payoffs 200 and 10 for the defendant and the plaintiff, respectively.

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.[11] 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. Once beliefs were elicited the actual strategy of the opponent was revealed to the

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

[10] This is the shorthand for experimental currency unit. One ECU corresponds to 0.03 Euros.

[11] 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.

subject and she was also reminded of her own strategy. The experiment then proceeded to the following round where each participant was matched with a new subject in the opposing role (perfect strangers).

There were 12 treatments each consisting of three blocks of 2 (*benchmark* condition) or 3 (*low proba* 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.

$r = 0.4$; $Y = 10$	*Benchmark* $p = 0.7$ $L = 10$	*High cost* $p = 0.7$ $L = 58$	*Low proba* $p = 0.1$ $L = 10$
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.

In the benchmark block (lasting two rounds) the probability of winning was so high and the cost of litigating so low that the optimal (highest expected monetary return) choice called for litigation by the plaintiff. Then again, in the low probability of winning block (lasting three rounds), the plaintiff's probability of winning was so low that it was (barely) suboptimal to litigate. On the other hand, in the high cost of litigation block (lasting three rounds), the cost was so high that it was again suboptimal to litigate. The (expected) court payoff to the plaintiff was equal in the low probability and in the high cost conditions. The deterministic court differed from the stochastic only in that the former implemented the expected litigation payoffs of the two parties with certainty whereas the stochastic court truly implemented a random draw using the publicly known probability of winning for the plaintiff such that the complementary probability was the winning probability of the defendant.

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 probability block.

3. PLAINTIFF'S LITIGATION CHOICES

The first round litigation rates across the various treatment conditions are given in Figure 2 below.

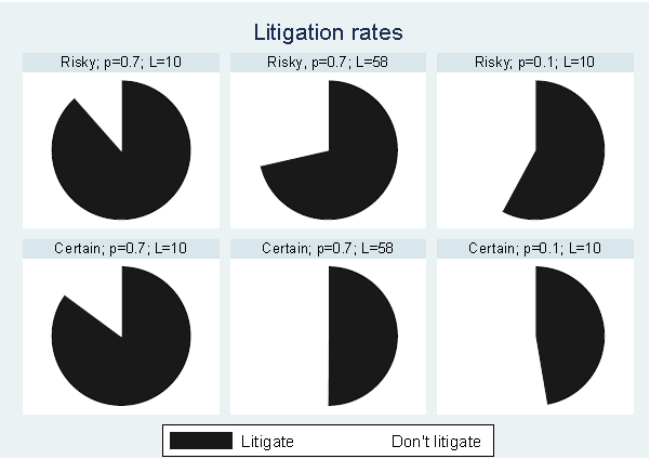

FIGURE 2: Litigation rates

There is more litigation in the conditions with uncertain trial outcomes (three top panels) than in the respective conditions which grant the corresponding expected payoffs for sure (bottom panels). The difference is significant whether the legal expenses and the plaintiff's chances of winning are high or low. Two-sided Mann-Whitney U-test gives p-value 0.0085 with aggregated data. Running the same test separately using data from conditions with expensive litigation and with low plaintiff-winning-probability only yields p-values 0.0404 and 0.0824, respectively. These tests exploit the first-round data only. If a one-sided test or data from first three rounds is used the p-values are even lower.

RESULT 1 *Litigation rate is higher when court is risky.*

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 trial outcomes are more variant. Traditional settlement negotiation theory prescribing to a pattern of choice axioms advocates that greater riskiness in court decisions would induce more precaution at the negotiation table thus reducing the conflict rate and widening the contract zone.[12] The above result yet alleges that the majority of plaintiffs, at least, are not risk averse but risk loving thus turning the conventional wisdom on its head. We will return to these issues in the follow-up section where we study the bargaining strategies in the settlement negotiations.

Still regarding litigation 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 resumed in Table 2 are in line with the comparative statics predictions of self-interested rationality. Yet, clearly our first-round data exhibits abundance of choices not maximizing expected monetary return. With low costs and high probability of winning, 10% of the subjects do not litigate although they should. With prohibitively high costs, still 59% of the subjects appeal to court while 41% of the subjects litigate when chances of winning are suboptimally low. The high frequency of litigation when it is not optimal is striking, underlining the behavioral

[12] For a review, see Hay and Spier (1998), for instance.

biases that must affect the plaintiff's choices, particularly so when court rulings are risky. In these cases the plaintiffs exhibit a puzzling tendency to take negative expected value bets. In Section 5, we will study more profoundly why plaintiffs might engage in excessive risk-taking when litigating.[13]

	Benchmark = High cost	*Benchmark = Low Proba*	*High cost = Low proba*
RISKY			
1st round rates	93% vs 75%	93% vs 63%	75% vs 63%
first-round	$p-value = 0.1407$	$p-value = 0.0293^{*}$	$p-value = 0.2845$
first block	$p-value = 0.1447$	$p-value = 0.0122^{*}$	$p-value = 0.0841$
CERTAIN			
1st round rates	87% vs 50%	87% vs 41 %	50% vs 41%
first-round	$p-value = 0.0171^{*}$	$p-value = 0.0034^{**}$	$p-value = 0.4548$
first block	$p-value = 0.0004^{*}$	$p-value = 0.0000^{**}$	$p-value = 0.1425$
TOTAL			
1st round rates	90% vs 59%	90% vs 41 %	59% vs 41%
first-round	$p-value = 0.0063^{**}$	$p-value = 0.0003^{**}$	$p-value = 0.2131$
first block	$p-value = 0.0004^{**}$	$p-value = 0.0000^{**}$	$p-value = 0.02^{*}$

TABLE 2
Mann-Whitney U-tests on null of equality litigation rates.

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. The dark grey area in Figure 3 indicates the share of defendants who deem litigation the more likely outcome in the case of impasse. The light grey area corresponds to the share of defendants who reckon court appeal as likely an outcome as abstinence. Thus summing up the dark and light grey areas admits a crude measure of the expected litigation rate.

It is reassuring to note that the defendants rather correctly tend to expect litigation to be more the more likely outcome in all conditions. The defendants also correctly expect more litigation when pressing charges is what self-interest calls for than when not (the benchmark condition as opposed to the other two). Yet, the defendants' in the benchmark and in the low probability conditions fail to conjecture that plaintiffs litigate more when courts make random rulings as opposed to certain rulings.[14] This misguided expectation by the defendants might thus contribute to high disagreement rate that we observe when trial outcomes are uncertain. We will study this issue in further detail in the follow-up section.

[13] Higher litigation cost imply lower litigation rates when looking at first round litigation choices, Looking at the difference more specifically across probabilistic and deterministic courts reveals that in fact this difference is only significant in the deterministic condition (p-value of 0.02), with rates 87% and 50% for the low (benchmark) and high cost, respectively. When the court rulings are risky, the difference in litigation rates of 93% and 75% is not significant (p=0.14). The rates for the benchmark condtion and the low proba condition, respectively, are 93% and 50% (p-value for the null 0.009) for the risky court and 87% and 32% for the certain court (p-value for the null of equality 0.002).

[14] One-sided Mann-Whitney U-test whether defendants expects more litigation with certain courts across risky and certain courts yields p-values of 0.04 for the low–plaintiff-winning-probability condition and 0.008 for the benchmark condition.

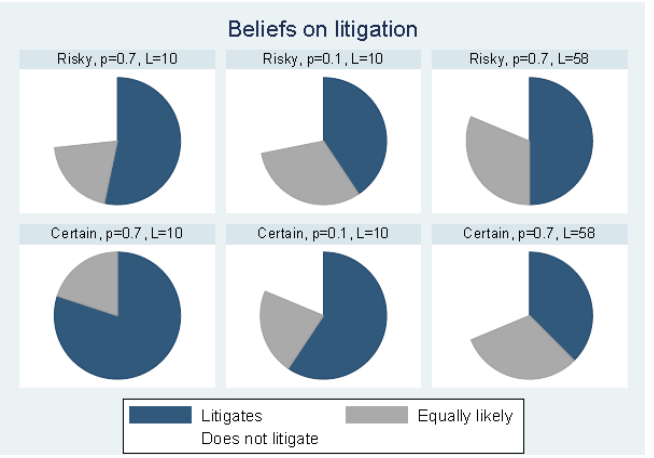

FIGURE 3: Beliefs on litigation

4. NEGOTIATIONS

Let us now turn our interest to how settlements are reconciled or how disagreement arises. Histograms in Figures 4 and 5 capture the defendants' and the plaintiffs' offers, respectively, for the three conditions with certain trials (three bottom panels) and the three risky court conditions (top panels) in the first two rounds. The black line in each subgraph depicts the empirical cumulative distribution of the acceptance thresholds, i.e. the aggregated acceptance probability in the population of agents on the opposing side.

Notice that the offer of 100, if accepted, shares the pie equally. While this equal split tends to be the modal offer, the offers to the plaintiffs are smaller than the offers to the defendants reflecting the higher conflict payoffs that the defendants receive in all conditions whether or not the plaintiff litigates. In fact the modal offer to the plaintiffs is 80 rather than 100 in many conditions and there is also much more dispersion in the offers to the plaintiffs.

The majority of acceptance thresholds are set between 80 and 100. This is reflected in the figures in the steep slope of the black curve between offers 80 and 100. The defendants set higher thresholds than the plaintiffs, again in line with their higher conflict payoffs and thus with the comparative statics prediction of self-interested sequential rationality.

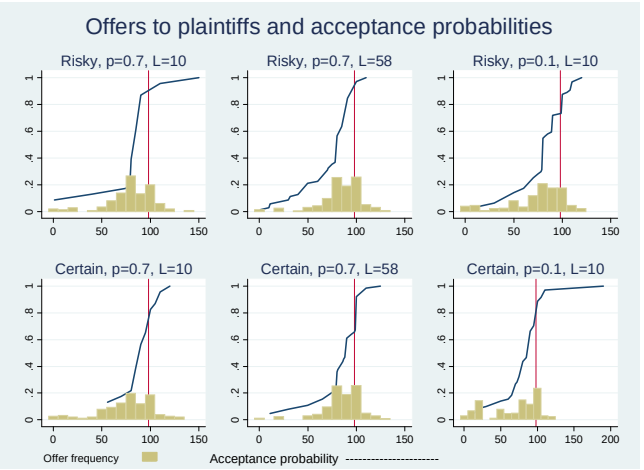

FIGURE 4: Offers to plaintiffs

The treatment-by-treatment disagreement rates are given in Table 3. The condition where adjudications are aleatory and the odds are against the plaintiff is most prone to conflict. Yet, when the court grants the corresponding expected returns for sure, the settlement rate is the highest. Not surprisingly then, the difference in disagreement rates is highly significant between these two conditions. The extent of disparity between the risky and certain conditions is exhibited in the median proposals and acceptance thresholds. The median proposal of 99 by the plaintiffs in the deterministic case is highly congruent with the defendants' median threshold of acceptance of 90. With risky court the median proposal by the plaintiffs is a meager 90 while the defendants' median threshold of acceptance is half of the pie, 100. Thus there is much more disagreement with variant trial outcomes. Nevertheless no differences between risky and certain court outcomes are detected when legal costs are high or when conditions are favorable to litigation.

RESULT 2 *When the plaintiff-winning-probability is low, the disagreement rate is significantly higher when courts are risky than certain.*

	Benchmark $p = 0.7$ $L = 10$	*High cost* $p = 0.7$ $L = 58$	*Low proba* $p = 0.1$ $L = 10$	*Total*
risky court	56%	50%	63%	73%
certain court	48%	50%	39%	53%

TABLE 3
Disagreement rate, first two rounds.

The defendants' mistaken expectations about the plaintiffs' litigation rate, reported in Section 3, are a likely driver of the high conflict rate when trial outcomes are risky and the plaintiffs have a small chance of coming in first. The defendants mispredict that with risky outcomes there is less litigation than with certain outcomes and in response they adopt much more aggressive negotiation strategies. As illustrated in the slower cumulation of acceptance in the top-right panel than in the bottom-right panel of Figure 5, the defendants set significantly higher acceptance thresholds when courts are risky (two-sided Mann-Whitney U p-value 0.0099). No

other significant differences in the the defendants' negotiation strategies are detected across conditions.

RESULT 3 *When the plaintiff's probability of winning is low, the defendants accept lower proposals when the court rulings are deterministic than when they are risky.*

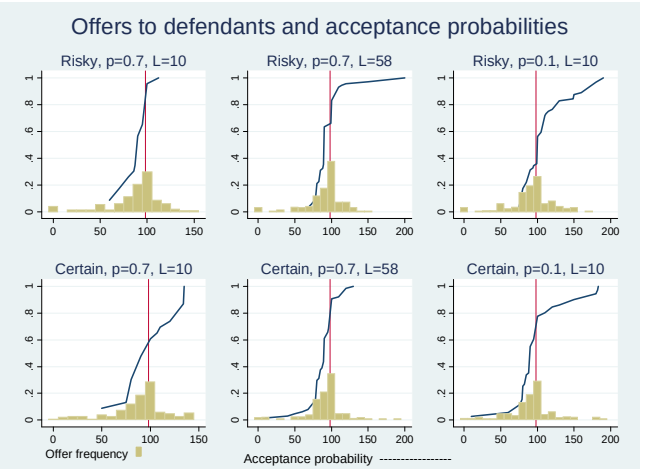

FIGURE 5: Offers to defendants

Also the plaintiffs' beliefs are optimistic. In Figure 6 the histogram expresses the frequency of the plaintiffs' guesses regarding the defendants' acceptance threshold. The black vertical line represents the actual median threshold set by the plaintiffs. The expectations of the plaintiffs differ significantly (at 5%-level) from the actual median only when court decrees are variant and the plaintiffs hold scant chances of winning which is reflected in the top-right panel of Figure 6 where most of the guesses are below the actual median of 100.[15] Under these circumstances, the plaintiffs also fail to predict the defendants' more aggressive bargaining stance compared to the case where courts grant the corresponding expected payoffs for sure. When comparing the differences between the defendant's actual acceptance threshold and that expected by the plaintiff, there is a larger gap when courts are risky than when they are certain (two-sided Wilcoxon signed rank test p-value 0.0374). There are no such differences when court decrees are costly or in the benchmark condition ideal for litigation from the plaintiff's perspective.

RESULT 4 *When the plaintiff's probability of winning is low, the plaintiffs have too optimistic beliefs about the defendants' acceptance thresholds when courts are risky. The defendants incorrectly expect a higher litigation rate when trial outcomes are certain than when they are risky.*

[15] Two-sided Wilcoxon signed rank test yields $p = 0.0015$.

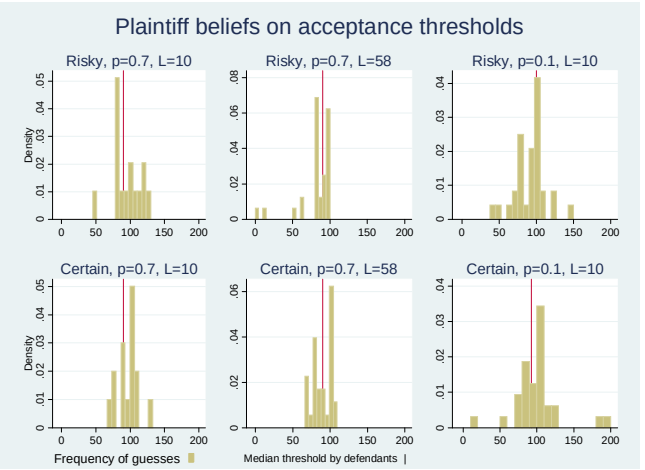

FIGURE 6: Plaintiffs' beliefs

When beliefs about court rulings are subjective, they tend to be self-serving in the sense that each side of the dispute expects the court to be favorable to themselves. Babcock and Loewenstein (1997) review the experimental evidence showing how this naturally leads to substantial degree of conflict in settlement. In our experiment this source of conflict is ruled out since winning probabilities and compensation is publicly known. Yet, the incentivized beliefs we elicit from the defendants and the plaintiffs suggest another domain of self-serving optimistic beliefs, those regarding the protagonist's behavior. In our experiment, the defendants' beliefs about the court appeals and the plaintiffs' beliefs about the defendant's reservation agreements turn out particularly biased in exactly those circumstances where the disagreement rate is highest. Thus it seems that it is these biased beliefs that are to be held partially accountable for conflict we observe in our experiment.

The plaintiff bias disappears with experience. In the first period the gap between the actual defendant minimum acceptance thresholds and the plaintiffs' beliefs thereof is devastating. By the third period the defendant behavior has converged to an average of about 100 and the plaintiff beliefs are correct.

RESULT 5 *Experienced plaintiffs' beliefs about acceptance thresholds are not biased.*

5. WHY RISK-SEEKING LITIGATION?

Our main finding regarding litigation, our first result, establishes that litigation rate is significantly higher when trial outcomes are variant. In the literature such risk-loving choice patterns most frequently appear in contexts where decision makers perceive themselves in a loss frame and are willing to take negative expected value bets on reducing losses. This is a pattern predicted by prospect theory (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). 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 asked to what extent

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.

The data allows for a straightforward test of this explanation by comparing litigation rates in the high cost and low probability conditions. Let us proceed with elaborating the argument why this is the case.

First notice that when court outcomes are certain, each side of the dispute is allocated her expected payoff in the corresponding random court condition for sure. The payoff of 8 ECU to the plaintiff is identical in the high cost and low probability conditions.[17] The conditions differ in how much the court ruling allocates to the defendant: 182 in the low probability condition and 86 in the high cost condition.[18]

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 punishment is effective.[19]

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 probability 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. [20]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 (Table 4). Moreover, the litigation rates in the high expense and the low-plaintiff-winning conditions fall drastically apart when trial outcomes are stochastic, (two-sided MW-U test *p=0.04205),* unlike in the deterministic case. Disadvantageous inequality is perceived as a loss and high costs generate more equal payoffs thus inducing loss averse subjects to take the negative expected rerturn

[16]See also Fehr and Schmidt, 1999.

[17]See section Experimental setup and Table 1.

[18]See footnote 15.

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

[20]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.

bet in the hope of substantially reducing the inequality. The difference remains significant with data from all rounds (Table 5), *p=0.002.* Thus not only seems riskiness to invite more litigation but it also seems to influence the other-regarding concerns themselves.[21]

3 rounds	low probability	high cost
RISKY	58%	69%
CERTAIN	40%	50%

TABLE 4: litigation rates with 3-round data

All data	low probability	high cost
RISKY	64%	73 %
CERTAIN	48 %	48 %

TABLE 5: litigation rates with 8-round data

The fact that litigation rates differ significantly when trial outcomes are risky but not when they are certain, clearly advocates that there is an interaction effect between other-regarding and risk preferences.

RESULT 6 *The litigation rates are higher with high costs than with low probability when court rulings are risky.*

6. RACHLINSKI CONJECTURE IN THE CONTROLLED LABORATORY

Rachlinski (1996) argued that, for the plaintiffs, any income received in settlement negotiations is a gain whereas defendants only incur losses with respect to their status quo payoff. Rachlinski conjectured that if prospect theory has any explanatory power, then one should expect the defendants in the prospect of making losses to bargain more aggressively than the plaintiffs with a prospect of making money.

To support his conjecture Rachlinski ran experiments with law students. He asked his subjects to consider hypothetical settlement negotiations, half of the subjects were assigned the role of plaintiff and the other half the role of the defendant. Each role received exact same instructions with publicly known prospects of winning for each side. Subjects were asked whether they would accept a given offer. Participants taking the role of a plaintiff were more likely to accept than those in the defendant role thus supporting his hypothesis.

Our setup may not be ideal for studying the conjecture since subjects may perceive every dollar earned in the lab as a gain and thus behave in a risk-averse manner irrespective of their role.[22] Yet, against both of these hypotheses, the

[21] The Mann-Whitney U -test result may overestimate the effect since each individidual's decisions are used from the first three rounds and these decisions are not independent. We also report probit regressions where we regress litigation choices on treatment variables. Coefficients on risky courts (PROB), benchmark condition (BENCH), and on the interaction of high litigation costs and risky courts (PROB*HIGH) are significant and positive while the coefficient on high cost (in the certain court case) is not. See Table 6 in the Appendix.

[22] See Rachlinski (1996, p. 134) expressing such concerns regarding experimental studies of the topic.

plaintiffs in our experiment behave very aggressively and are even more willing to litigate and to take negative expected return bets when the bet is generic and truly random.

In Section 5, we claimed that equity reference may not only matter for its own sake, but as well heavily influence risk taking. Our litigation data is consistent with the hypothesis that the focal equal sharing might constitute the neutral reference level for assessing risky lotteries.[23] Below the reference level, plaintiffs are willing to bet on even negative expected value lotteries particularly if there is a chance of reaching equal outcomes. Thus the plaintiff choices would exhibit preference for risk if anything. This is indeed what we by and large observe when we look at the plaintiff's litigation decisions. Yet, surprisingly, the plaintiffs' *bargaining behavior* does not seem to be more aggressive or risk-seeking when the court decisions are risky. In fact, and line with the Rachlinski conjecture, we find quite the opposite.[24]

RESULT 7 *The plaintiffs are willing to accept lower proposals when the court decisions are risky (p=0.0066 with the data from the first two rounds, and p=0.0001 with data from all rounds).*

RESULT 8 *There are no significant differences in the proposals when court decisions are risky or certain (p=0.35 with data from all rounds). On the defendants' side there are no significant differences in negotiation behavior between risky and uncertain outcomes (with p=0.08 for two-round data and p=0.49 with all data) but for the case of low winning probability case, where thresholds are more aggressive with risky outcomes.*

7. CONCLUSION

We study plaintiff's decisions to raise a lawsuit after failed settlement negotiations in a controlled frameless laboratory experiment. 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. This may be due to loss aversion on the side of the plaintiff. This requires that the neutral reference point around which the gains and losses are evaluated lies above the conflict payoff if one does not litigate. We find evidence that the reference payoff is influenced by a social comparison with the defendant: the plaintiff's expected payoff falls short of that of the defendant; the risky court yet provides a chance of coming in first and getting the upper hand. This is a chance that plaintiffs seem to be willing to bet their money on. Our incentivized behavioral results thus comply with the findings of Loewenstein et al (1989) in a hypothetical negotiation setting. Our regression results exploiting the full data largely confirm these patterns and thus learning seems to play little role in litigation. Notice that in a contextually richer framework, this effect 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

[23] Lowenstein et al. (1989) find evidence in line with the equity reference hypothesis in a study where subjects self-report their satisfaction with the outcome in hypothetical dispute situations.

[24] In our experiment as opposed to Rachlinski, we use a non-framed controlled laboratory setting where actions are incentivized with actual small stakes. Each of the two experimental designs has its advantages and the settings are different enough to only allow to speculate about the main drivers of differences in behavior.

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 frameless 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 conflict seems to be driven by self-serving expectations about the opponents' non-aggressive responses which turn out to be untrue. Yet, subjects learn to get rid of their biased expectations and thus in the longer run bargaining outcomes are more efficient. This suggests that experienced lawyers acting for their principals may play an important role in yielding settlements and reducing the number of cases ending up burdening court rooms.

To study this and related questions of external validity, we also collected a small pilot data with professional patent right lawyers in Finland in December 2009. The data suggests that professionals do not exhibit risk-loving litigation behavior or loss-aversion but rather litigate more when the court is deterministic (even when self-interest dictates not to do so). This evidence together with the above mentioned regression results concerning self-serving biases suggest that experienced subjects may learn to get rid of their conflict inducing biases. Interestingly, in the post-experimental debriefing conversations, many lawyer participants pointed out to be extremely aversive of having to call the client to tell about a lost court case. This supports the observation that it is experience, perhaps regret in particular, that makes professionals more risk averse.

The plaintiffs' risk-seeking choice patterns in the litigation stage but risk-averse behavior in the bargaining stage leaves open many questions about the main drivers of settlement behavior, perhaps suggesting an interaction between the negative reciprocity and the risk-preference factors. It can also be seen as supporting Korobkin's (2002) view that bargaining aspirations shift and influence reference payoffs since risk-preference patterns look different at and off the negotiations table. Clearly, both experiments suggest that at least the standard expected utility maximization approach to settlement negotiations may not be warranted. Aspirations may be guided by known damages rules-of-thumb (e.g. Goldscheider rule in patent cases (see Goldscheider et al 2002)), precedents, comparable licenses, or management incentives and goal setting about target outcomes, for instance.

BIBLIOGRAPHY

Ashenfelter, O, Currie, J., Farber, H.S., Spiegel, M. 1992. An Experimental Comparison of Dispute Rates in Alternative Arbitration Systems. Econometrica 60, 1407-1433.

Babcock, L., Loewenstein, G., Wang, X.1995. The relationship uncertainty, the contract zone, and efficiency in a bargaining experiment. Journal of Economic Behavior and Organization 27, 475-485.

Babcock, L., Loewenstein, G. 1997. Explaining Bargaining Impasse: The Role of Self-Serving Biases. Journal of Economic Perspectives 11(1): 109-126.

Bartling, B., Fischbacher, U. 2011. Shifting the Blame: On Delegation and Responsibility, Review of Economic Studies, forthcoming.

Bolton, G.E., Brandts, J., Ockenfels, A. (2005). Fair Procedures: Evidence from Games Involving Lotteries. Economic Journal 115, 1054-1076.

Camerer, C. (2003). Behavioral Game Theory. Princeton University Press.

Camerer, C., Talley, E., 2007 Experimental Study of Law. In: S. Shavell and A. M. Polinsky (eds.) Handbook of law and economics 2, North-Holland.

Coase, Ronald. 1960. The Problem of Social Cost. Journal of Law and Economics 3, 1-44.

Coughlan P, Plott C. 1997. An Experimental Analysis of the Structure of Legal Fees: American Rule vs. English Rule.

Coursey, D. L., & Stanley, L. R. (1988). Pretrial Bargaining Behavior within the Shadow of the Law: Theory and Experimental Evidence. International Review of Law and Economics, 8, 161-79.

Daugherty, A. 2000. Settlement. In B. Bocjaert &. G. De Geest (eds.) Encyclopedia of Law and Economics, Edward Elgar, Cheltenham.

Falk, A., Heckman, J. 2009. Lab Experiments Are a Major Source of Knowledge in the Social Sciences. Science 326: 535-538.

Fehr E, Schmidt, K.M. 1999. A Theory of Fairness, Competition, and Cooperation. The Quarterly Journal of Economics 114(3): 817-868.

Fischbacher, U. 2007. z-Tree: Zurich toolbox for ready-made economic experiments. Experimental Economics 10, 171-178.

Goldscheider, R., Jarosz, J., Mulhern, C. 2002. Use of the 25 Per Cent Rule in Valuing IP. Les Nouvelles December, 123-133.

Gould, J.P. 1973. The Economics of Legal Conflicts, Journal of Legal Studies 2, 279-300.

Greiner, B. 2004. The Online Recruitment System ORSEE 2.0 - A Guide for the Organization of Experiments in Economics. Working Paper Series in Economics , University of Cologne, Department of Economics.

Guthrie, C. 2003. Prospect Theory, Risk Preference & the Law. Northwestern University Law Review 97, 1115-1163.

Hay, B., Spier, K. 1998. Litigation and Settlement. In: Peter Newman (ed.) The New Palgrave Dictionary of Economics and the Law 44, MacMillan, UK.

Holt, C. A., Laury, S. K. 2002. Risk Aversion and Incentive Effects. American Economic Review 92, 1644-1655.

Kahneman D, Tversky A. 1979. Prospect Theory: An Analysis of Decision under Risk. Econometrica 47(2): 263-291.

Korobkin, R. B. 2002. Aspirations and Settlement. Cornell Law Review 80, 1-61.

Landes, W. 1971. "An Economic Analysis of the Courts." Journal of Law and Economics 14, 61-107.

Loewenstein, G. F., Thompson, L., Bazerman, M.H. 1989. Social Utility and Decision Making in Interpersonal Contexts. Journal of Personality and Social Psychology 3, 426-441.

McAdams, B. 2000. Experimental Law and Economics. In: Bouckaert, Boudewijn and De Geest, Gerrit (eds.) Encyclopedia of Law and Economics, Volume I. The History and Methodology of Law and Economics, Cheltenham, Edward Elgar.

Nyarko, Y., Schotter, A. 2002: An Experimental Study of Belief Learning Using Elicited Beliefs, Econometrica, 70, 971-1005.

Ostrom, B.J., Kauder, N., B., LaFountain, R. C. 2001. Examining the Work of State Courts. Examining the Work of State Courts, 2001: A National Perspective from the Court Statistics Project, National Center for State Courts.

Plott, C. 1987. Legal Fees: A Comparison of the American and English Rules, Journal of Law, Economics, & Organization 3, 185-192.

Posner, R. A. 1973. An Economic Approach to Legal Procedure and Judicial Administration. Journal of Legal Studies 2, 399-458.

Rachlinski, J. 1996. Gains, losses, and the psychology of litigation. Southern California Law Review 70, 113-185.

Raiffa, H. 1982. The Art and Science of Negotiation. Belknap Press of Harvard University Press, CA.

Shavell, S. 1982. Suit, Settlement, and Trial: A Theoretical Analysis under Alternative Methods for the Allocation of Legal Costs. Journal of Legal Studies 11:55-81.

Slonim, R.; Roth, A. 1998. Learning in High Stakes Ultimatum Games: An Experiment in the Slovak Republic. Econometrica 66, 569-596.

Tor A., Gazal-Ayal, O., Garcia S. M. 2010. Fairness and the Willingness to Accept Plea Bargain Offers. Journal of Empirical Legal Studies 7, 97-116.

Tversky, A., Kahneman, D. 1992. Advances in Prospect Theory: Cumulative Representation of Uncertainty. Journal of Risk and Uncertainty 5, 297–323.

8. APPENDIX

8.1. Regressions

Here we study the litigation behavior in all the 8 rounds in our random strangers design in probit regressions. Since the regressions analyze behavior from all rounds, not merely the initial ones, they reveal more about the dynamic behavioral patterns, whether subjects learn away from their potential biases in particular. Table 6 looks at the plaintiffs' litigation choices. It suggests that even when taking into account the dynamics, whether courts make random (PROB=1) decision or act under publicly known certainty has a significant effect on litigation rates. In regression (1) only the main treatment variable of interest of interest is used as a regressor. In (3) litigation choices are cleanly regressed on exogenous treatment variables only (dropping insignificant interaction term BENCH*PROB). The variable AVERAGE attempts to control for individual heterogeneity by capturing the average of each subject's other choices in the same condition.[25] We add this control to regressions (2) and (4). In (5) we study whether subject's expectations about the aggressiveness of the opponent's bargaining strategy might play a role. Subgame perfection rules this out but our and previous results on the role of intrinsic reciprocity suggest that there might be a positive dependence between the expected opponent acceptance threshold (guess_respon) and the litigation choice.

[25] Usage of random effects is not feasible here due to small amount of data. This approach was adopted by Slonim and Roth (1998).

	(1)	(2)	(3)	(4)	(5)
(intercept)	0.16**	-1.03***	-0.03	-1.06***	-0.66**
	(0.05)	(0.08)	(0.08)	(0.10)	(0.23)
PROB	0.46***	0.226*	0.36***	0.17	0.158
	(0.10)	(0.09)	(0.10)	(0.12)	(0.12)
BENCH	-	-	0.95***	0.47	0.48***
			(0.11)	(0.13)	(0.13)
HIGH	-	-	-0.02	-0.03	-0.06
			(0.11)	(0.13)	(0.13)
PROB*HIGH	-	-	0.31*	0.16	0.17
			(0.15)	(0.18)	(0.18)
AVERAGE	-	2.17***	-	2.09***	2.07***
		(0.10)		(0.10)	(0.10)
guess_respon	-	-	-	-	-0.004
					(0.002)

* =5% , **=1% , ***=0.1% level
(standard errors in the parentheses)

TABLE 6: Probit regressions of litigation choice (0, not litigate; 1, litigate)

The main result is visible in regressions (1), (2), and (3) which all lean towards the risk-seeking litigation behavior evidence. Litigation is in private self-interest in the BENCH condition, and the probit regression (3) finds a highly and strong positive effect. Interestingly, regression (3) also supports our finding in Section 3 that there is a significant positive interaction between the riskiness of courts and the high litigation costs (PROB*HIGH), which is a condition with substantially lower opponent payoff than in the low probability condition.

Introducing the control for individual heterogeneity in regression (4) tends to downplay any significant effects of the treatment variables. We are not sure whether this suggests that subjects unlearn any initial treatment effects or whether our approach of controlling for individual heterogeneity through the introduction of AVERAGE is inadequate and one should aim to gather larger datasets where individual random effects could be introduced in the future.

We also ran OLS estimations using treatment variables to explain bargaining behavior; responses in particular (Tables 7 and 8). We find that plaintiffs (Table 7) are less aggressive in their responses when courts are random, in line with the Rachlinski (1996) conjecture, and they are more aggressive in the benchmark condition (as predicted by self-interested sequential rationality and risk aversion), although again using AVERAGE of the subject's choice from the other rounds undoes any effects. Notice that the first effect goes against the results we have from simple non-parametric tests from the initial rounds, where plaintiffs were more aggressive when courts were risky. Thus more experienced subjects seem to

learn away from their initial conflict tendencies in this condition.

	(1)	(2)
(intercept)	79.51***	80.51***
	(1.57)	(1.89)
PROB	-4.02*	-6.03*
	(1.64)	(2.67)
BENCH	8.27***	6.83*
	(2.14)	(3.03)
HIGH	0.11	-1.62
	(1.89)	(2.67)
PROB*HIGH	-	3.46
		(3.77)
PROB*BENCH	-	2.87
		(4.28)

* =5% level, ***=0.1% level (std. err:s in parentheses)

TABLE 7: OLS regressions of plaintiff minimum acceptance thresholds

Analogously, defendants (Table 8) are less aggressive in their responses (i) when courts are risky, (ii) when costs are high, (iii) and when it is optimal to litigate (BENCH) in the longer run. These are all in line with risk-aversion, and sequential self-interested rationality in a probabilistic choice framework.[26]

	(1)	(2)
(intercept)	109.01***	110.34***
	(1.66)	(2.00)
PROB	-2.94'	-5.59*
	(1.74)	(2.83)
BENCH	-5.94**	-6.64*
	(2.27)	(3.2)
HIGH	-15.79***	-18.84***
	(2.00)	(2.83)
PROB*HIGH	-	6.09
		(4.00)
PROB*BENCH	-	1.40
		(4.53)

'=10% level, * =5% level, **=1%-level, ***=0.1% level (std. err. in parentheses)

TABLE 8: OLS regressions of defendant minimum acceptance thresholds

Thus the subjects have a tendency to learn to overcome the initial high impasse rate and inefficiency in the longer run and to learn to behave less aggressively in those conditions.

[26] Introducing AVERAGE to control for individual heterogeneity undoes all effects.