An analysis of bounded rationality in judicial litigations: the case with loss/disappointment averses plaintiffs

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AN ANALYSIS OF BOUNDED RATIONALITY IN JUDICIAL LITIGATIONS: THE CASE WITH LOSS/DISAPPOINTMENT AVERSE PLAINTIFFS

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Abstract: *For psychologists, bounded rationality reflects the presence of cognitive dissonance and/or inconsistency, revealing that people use heuristics (Tversky and Kahneman (1974)) rather than sophisticated processes for the assessment of their beliefs. Recent research analyzing litigations and pretrial negotiations also focused on boundedly rational litigants (Bar-Gill (2005), Farmer and Peccorino (2002)) relying on a naïve modelling of the self-serving bias. Our paper in contrast introduces the case for disappointment averse litigants, relying on the axiomatic of Gull (1991). We show that this leads to a richer analysis in comparative statics; at the same time, this proves to be … disappointing: for the purposes of public policies in favour of the access to justice, recommendations are quite ambiguous*.

Keywords: conflicts, litigation, negotiation, disappointment aversion.
JEL classification: D81, K42.

1. Introduction

Two prominent theories have been suggested to explain how informational imperfections introduce biases in litigants' assessment of the outcome of trial, and to describe the failure of pretrial negotiations they imply. According to the "optimistic approach" (Priest and Klein (1984), Shavell (1982)), the plaintiff is more confident than the defendant about his own chances to win at trial - the more confident the plaintiff relative to the defendant, the more likely the trial. In the "strategic approach" (Bebchuk (1984)), the settlement amount proposed by one party may not be acceptable by the other given its *unobservable* type - thus disputes are sometimes solved in front of Courts (see Daughety (2000), Langlais and Chappe (2009) for a survey).

More recently, Farmer and Pecorino (2002) and Bar-Gill (2002,2005) investigate a new line of research, assuming that litigants exhibit a form of bounded rationality that has been documented in the experimental literature (Tversky and Kahneman (1974)): the *self-serving bias*. Farber and Bazerman (1987) long ago argued that neither divergent expectations nor asymmetric information provide sufficient explanations for the existence of a disagreement in bargaining; in contrast, the existence of cognitive limits and bounded rationality, provide powerful arguments. A growing literature in the area of *behavioral law and economics* has also provided empirical and experimental evidence for the presence of anchoring effects and optimistic or self-serving bias on behalf of individuals in civil litigations. But cognitive biases are also exhibited by well experienced lawyers and judges (Ichino, Polo and Rettore (2003), Marinescu (2005), Rachlinski, Guthrie and Wistrich (2007), Viscusi (2001)) as well as more naive individuals (Babcock and Loewenstein (1997)).

In this paper, we explore the consequences of the assumption that plaintiff's preferences

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under risk are characterized by *disappointment aversion*. Our basic intuition is that *disappointment aversion* in contrast to optimism should favour pretrial negotiations: given that plaintiffs could experience an unfavourable outcome at trial (if the Court sets the case for the defendant), they may be pushed towards accepting to settle amicably more frequently *and* in less favourable terms (settlement amounts). Grant, Kajii and Pollak define very generally *disappointment aversion* as follows (Grant, Kajii and Pollak, 2001, p 203): "When a lottery (or 'act') results in a relatively bad outcome, agents may experience disappointment at not having got a better outcome. This disappointment can worsen the disutility that the outcome produces directly. Similarly, relatively good outcomes can yield pleasurable feelings of 'elation' over and above the utility that the outcomes produce directly. A *disappointment averse* agent is one who dislikes disappointment more than she likes elation; this reduces the certainty equivalent value of lotteries or acts."

More specifically, we assume that the plaintiff displays disappointment aversion in the sense of Gul (1991): an outcome causes disappointment if it is worse than the certainty equivalent of the lottery. As a result, his preferences are characterized by the existence of an index (of disappointment aversion) denoted $\beta > 0$, such that when he faces a risky prospect $X = (x_1, 1-p; x_2, p)$, with $x_1 < x_2$, his subjective expected gain is defined as[2]:

$$\begin{aligned} A(X) &= \left(1 + \frac{p\beta}{1+(1-p)\beta}\right)(1-p)x_1 + \left(1 - \frac{(1-p)\beta}{1+(1-p)\beta}\right)px_2 \\ &= \left(\frac{(1+\beta)(1-p)}{1+\beta-\beta p}\right)x_1 + \left(\frac{p}{1+\beta-\beta p}\right)x_2 \end{aligned}$$

Everything goes as if the plaintiff assesses a belief corresponding to his chances to win x_2, denoted as $\sigma(p)\left(=\frac{p}{1+\beta-\beta p}\right)\in]0,1[$, which is smaller than his true probability - and thus leading to a under assessment of the contribution of the largest outcome in the lottery to the total gain (utility); symmetrically, his belief corresponding to his chances to win a smaller gain x_1, denoted as $1-\sigma(p)$, is larger than his true probability - and thus leading to an over assessment of the contribution of the smallest outcome in the lottery to the total gain (utility). As a result, the subjectively expected gain is smaller than the expected outcome of the lottery[3]: $A(X) < E(X)$.

Section 2 describes the complete model of pretrial negotiations, which is essentially an adaptation of Bebchuk (1984) where plaintiffs are no more risk neutral but averse to disappointment, and analyses its equilibrium. Section 3 focuses on the comparative statics. Section 4 enlarges the discussion and concludes.

2. The model

2.1 Assumptions and timing of the negotiations

We consider a plaintiff which is hurt by an accident that may be the result of negligence or wrongdoings by another party, the defendant. The loss borne by the plaintiff in case of accident is $D > 0$ and corresponds to the damages set by the Court in case where the trial is in favour of the victim. The compensation D is public information. Nevertheless, p the probability that the judgment at trial be in favour of the victim is private information; it is observable only to the plaintiff

[2] The marginal utility of money is supposed to be constant.
[3] Hence, disappointment aversion implies risk aversion (Gull (1991)).

(p will be termed the type of the plaintiff). We assume that the defendant only knows that[4] $p \in [a,b]$ and is distributed according to a probability function characterized by the cumulative function $G(p)$ and the density $g(p)$, which are public information. In order to rule out secondary difficulties, we introduce the following assumption:

Assumption 1: the inverse of the hazard rate $\frac{G}{g}$ is increasing.

As explained in the introduction, we assume that the plaintiff displays disappointment aversion in the sense of Gul (1991), with an index (of disappointment aversion) denoted as $\beta > 0$, which is public information. Interestingly enough, it is straightforward that disappointment aversion in the sense of Gul implies loss aversion in the sense of Schmidt and Zank (2005). These authors suggest a definition of the behavioral concept of loss aversion which is more general than the one initially introduced by Kahneman and Tversky (1979): loss aversion holds in the sense of SZ if comparing two symmetric prospects $X = (x,½;-x,½)$ and $Y = (y,½;-y,½)$ where $x > y \geq 0$, then the individual prefers Y to X. Given that we assume a linear utility for money, it is obvious that for any $\beta > 0$, a disappointment averse plaintiff is also a loss averse one.

Finally, we consider here that the defendant is a disappointment neutral individual.

The negotiation game has two main stages, after that Nature has choosen the type of the plaintiff p in $[a,b]$, and after that the plaintiff has sued his case:

- In a first stage, the defendant makes a "take-it-or-leave-it" offer of settlement to the plaintiff, denoted s, in order to reach a amicable settlement of the case.
- In the second stage, depending on his type, the plaintiff accepts the offer (thus, the case is settled) or rejects it, in which case parties go to trial.

We introduce the American rule in order to describe the allocation of the costs borne by each parties at trial. We denote: $C_p > 0$ the plaintiff's costs and $C_d > 0$ the defendant's costs.

Formally, the plaintiff's anticipated gain when he is of type p (thus he faces the prospect $X = \left(D - C_p, p; -C_p, 1-p\right)$) is written:

$$A(X) \equiv \sigma(p)D - C_p$$

It is easy to verify (useful later on) that $\frac{d}{dp}\sigma(p) = \frac{\sigma(1-\sigma)}{p(1-p)} > 0$ such that $\frac{\sigma(1-\sigma)}{p(1-p)} > or < 1$, and $\frac{d}{d\beta}\sigma(p) = -\frac{\sigma(1-\sigma)}{1+\beta} < 0$. On the defendant side when he faces a plaintiff of type p, the risky trial is a prospect denoted $Y = (-(D + C_d), p; -C_d, 1-p)$, and the expected loss borne by the defendant is: $E(-Y) \equiv pD + C_d$. Finally we assume that $D > C_p + C_d$ meaning that the case to be solved is socially worth.

2.2 The separating equilibrium

The equilibrium is described in terms of the amount for which the parties settle s (the equilibrium offer) and of the probability of a trial corresponding to the marginal plaintiff $p(s)$, the one who is indifferent between accepting the offer or rejecting it and going to trial.

In the second stage, the plaintiff p chooses between a sure prospect: to accept the offer s, and a risky prospect: going to trial X, with an anticipated loss $\sigma(p)D - C_p$. As a result, plaintiff p

[4] We assume that $a > 0$ in order to rule out the case of frivolous suits, and $b < 1$.

accepts the offer s soon as: $s > \sigma(p)D - C_d$. Otherwise, he rejects it. Let us denote as $p(s)$ the expectation of the marginal plaintiff by the defendant:

$$\sigma(p(s))D - C_p = s \qquad (1)$$

Any plaintiff having a case weaker than the marginal type (any $p \leq p(s)$) also accepts the offer, while any plaintiff having a stronger case ($p > p(s)$) goes to trial.

Coming back to the first stage, we are allowed to write the loss function according to which the defendant will set his best offer. With probability $G\big(p(s)\big)$, the defendant knows he will face a defendant prone to accept his settlement offer, and thus obtains an outcome s to settle the case. But with probability $1 - G\big(p(s)\big)$, the defendant knows he will face a case stronger than the marginal one, and thus will have to bear the risk of trial. Let us denote as $\mu(s) = \int_{p(s)}^{b} p \frac{g(p)}{1-G(p(s))} dp$ the mean type of the plaintiff conditional to the population having rejected the amicable offer and going to trial; thus the anticipated expenditure borne by the defendant at trial is $\mu(s)D + C_d$. The defendant will propose the best offer $\hat{s} \geq 0$, which minimizes the loss function:

$$L(s) = G(p(s)) \times s + (1 - G(p(s))) \times \left(D \int_{p(s)}^{b} p \frac{g(p)}{1 - G(p(s))} dp + C_d \right)$$

$$= G(p(s)) \times s + \left(\int_{p(s)}^{b} pg(p)dp \right) \times D + (1 - G(p(s))) \times C_d \qquad (2)$$

under condition (1).

Proposition 1: *In an interior equilibrium, the offer* $\hat{s}$ *and the marginal defendant* $\hat{p}$ *are set according to the following conditions:*

$$\hat{s} = \sigma(\hat{p})D - C_p \qquad (3)$$

$$\left(\frac{G}{g} \right)_{|\hat{p}} = \left(\hat{p} - \sigma(\hat{p}) + \frac{C}{D} \right) \times \frac{\hat{p}}{\sigma(\hat{p})} \times \frac{1 - \hat{p}}{1 - \sigma(\hat{p})} \qquad (4)$$

where $C \equiv C_p + C_d$ *and* $\sigma(\hat{p}) = \frac{\hat{p}}{1+\beta-\beta\hat{p}}$ *, such that the probability of a trial is* $\hat{\pi} = 1 - G(\hat{p})$ *.*

Proof: If $\hat{s} > 0$ and $\hat{p} \in]a, b[$ are an admissible interior solution for the minimization of (2), then the First Order Condition writes as:

$$G(\hat{p}) - g(\hat{p}) \frac{1}{D} \left(\frac{\hat{p}}{\sigma(\hat{p})} \times \frac{1 - \hat{p}}{1 - \sigma(\hat{p})} \right) (\hat{p}D - \sigma(\hat{p})D + C) = 0 \qquad (5)$$

Rearranging the various terms leads to (4). In the appendix, we give a brief sketch of the conditions under which (3)-(4) have a unique solution. ■

Two terms are worth to notice in the LHS term in (5). The first one is the marginal cost of the offer for the defendant since raising the offer leads to an increase in the settlement cost equal to the probability of settlement. The second LHS term in (5) is the marginal benefit of the offer which may be split in two components:

- on the one hand, the effect of raising the offer on the probability of trial, $\frac{d}{ds}(1-G(p(s)) = -g(\hat{p})\frac{1}{D}\left(\frac{\hat{p}}{\sigma(\hat{p})}\times\frac{1-\hat{p}}{1-\sigma(\hat{p})}\right) < 0$; this term reflects the efficiency of the screening of the various plaintiff's types due to an increase in the settlement amount;
- on the other hand, the gains of the negotiation at the marginal defendant $\hat{p}D - \sigma(\mu(\hat{s}))D + C > 0$; this one obviously reflects the gain associated to the screening of the plaintiffs according to their type.

In Bebchuk's seminal model (if the informed party were the plaintiff, being neutral to disappointment) the equivalent to condition (4) is:

$$\left(\frac{G}{g}\right)_{|\hat{p}} = \frac{C}{D}$$

As a result, the impact of disappointment aversion on the equilibrium is twofolds: on the one hand, it increases the gains of the negotiation since $\hat{p} - \sigma(\hat{p}) > 0$; on the other hand, it may either increase or decrease the efficiency of the separation between plaintiffs since $\frac{\hat{p}}{\sigma(\hat{p})}\times\frac{1-\hat{p}}{1-\sigma(\hat{p})} > or < 1$. Hence, as compared to the case of Bebchuk (1984), the rate of trial may decrease or increase. We investigate more precisely these effects and their meaning in the comparative statics part of the paper.

3. Comparative statics

Results concerning the influence of fee shifting, costs and damages are identical to those obtained in Bebchuk and thus are not reproduced. We focus rather on the influence of disappointment aversion, and on the change in the range of the plaintiff's types.

Proposition 2. *An increase in* β :

- increases the type of the marginal plaintiff and thus decreases the rate of trial if $\hat{p} \leq \frac{1+\beta}{2+\beta}$ *; otherwise, the effect is ambiguous.*

- has an ambiguous effect on the settlement offer; more specifically, if the marginal type decreases then the offer always decreases, although if the marginal plaintiff increases, the offer may decrease or increase.

Proof. The sign of the effect of an increase in β on the marginal plaintiff is given by the sign of its impact on the RHS in (4) which writes:

$$\left(-\frac{d}{d\beta}\sigma(\hat{p})\right)\left(\frac{\hat{p}}{\sigma(\hat{p})}\frac{1-\hat{p}}{1-\sigma(\hat{p})}\right)\left(1+\left(\frac{G}{g}\right)_{|\hat{p}}\times\frac{1-2\sigma(\hat{p})}{\hat{p}(1-\hat{p})}\right)$$

The two first terms are positive (given that $\frac{d}{d\beta}\sigma(\hat{p}) < 0$). Thus it is straightforward to verify that a sufficient condition to obtain a positive effect is that (at the initial value of $\hat{p}$): $1-2\sigma(\hat{p}) \geq 0 \Leftrightarrow \hat{p} \leq \frac{1+\beta}{2+\beta}$.
The effect on the settlement offer $\hat{s} = \sigma(\hat{p})D - C_p$ depends on two effects: on the one hand, the direct effect of β on $\sigma(p)$ which is always negative, and on the other the effect induced through the variation of $\hat{p}$, which may be positive or negative. Hence the result. ■

For their own, Farmer and Pecorino (2002) introduced the self-serving bias in Bebchuk's model, and found that an increase in the optimistic bias of the plaintiff increases the frequency of trial and decreases the settlement amount. Thus, it is quite surprising to find that disappointment has an ambiguous effect on the equilibrium. In order to understand the result, we may investigate what occurs in a case where the parties have not the opportunity to have a pretrial negotiation. In this case, the participation constraint of the plaintiff shows that all types p for which $\sigma(p)D - C_p \geq 0$ will go to trial, meaning that only the cases stronger than $p_0 = \frac{1+\beta}{1+\beta\frac{C_p}{D}} \times \frac{C_p}{D}$ will go to trial (chooses the conflict). The weakest ($p < p_0$) are sorted out. Hence, the probability of trial is equal to $1 - G(p_0)$ which is (non ambiguously) decreasing in β (given that p_0 increases with β). This means that without any opportunity to solve their case, plaintiffs sensible to disappointment aversion will be prone to temperate their willingness to obtain a compensation for the injury they have suffer from, the larger their disappointment aversion the smaller the rate of litigation.

The next propositions introduce two different modifications in the population of plaintiffs. We first develop the analytics in two separate propositions, and, second, jointly comment the results.

Proposition 3: *An additive shift to the right in the range of plaintiff's type:*
- gives a less than proportional increase in the type of the marginal plaintiff if $\hat{p} \geq 1 - \frac{\sqrt{1+\beta}-1}{\beta}$ *; otherwise, it may lead to a more than proportional increase in the marginal plaintiff;*
- increases the probability of trial if $\hat{p} \geq 1 - \frac{\sqrt{1+\beta}-1}{\beta}$ *; otherwise, the effect is ambiguous.*
- increases the equilibrium offer.

Proof. We define (see also Bebchuk (1984)) an additive shift to the right of the range of plaintiff's types as a t -translation of plaintiff's types, such that p is now distributed in the interval $[a+t, b+t]$ (with $t \geq 0$) with the cumulative $\Gamma(p)$ and the density $\gamma(p)$ satisfying the following correspondences with the primitives $G(p)$ and $g(p)$:

$$\Gamma(p) = G(p-t)$$
$$\gamma(p) = g(p-t)$$

In fact, these two conditions characterize a family of distribution functions which is parametrized by $t \geq 0$, where $t = 0$ gives us the primitives, and $t > 0$ leads to a distribution with a higher mean type but having identical higher order moments. In this case, the condition (4) may be substituted with the general formulation:

$$\left(\frac{G}{g}\right)_{|(\hat{p}-t)} = \left(\hat{p} - \sigma(\hat{p}) + \frac{C}{D}\right) \times \frac{\hat{p}}{\sigma(\hat{p})} \times \frac{1-\hat{p}}{1-\sigma(\hat{p})} \tag{6}$$

with $\hat{\pi} = 1 - G(\hat{p} - t)$ and $\hat{s}$ given by (3). Differentiating (6) gives:

$$\frac{d\hat{p}}{dt} = \frac{1}{\Delta}\left(\frac{G}{g}\right)'_{|(\hat{p}-t)}$$

with: $\Delta \equiv \left(\frac{G}{g}\right)'_{|\hat{p}} + 2\left(\frac{G}{g}\right)_{|\hat{p}} \times \frac{\hat{p}-\sigma(\hat{p}))}{\hat{p}(1-\hat{p})} + 1 - \frac{\hat{p}}{\sigma(\hat{p})} \times \frac{1-\hat{p}}{1-\sigma(\hat{p})} > 0$ according to the second order condition. Thus, it is obvious that $\frac{d\hat{p}}{dt} > 0$ since under assumption 1 the numerator is also positive: $\left(\frac{G}{g}\right)'_{|(\hat{p}-t)} > 0$. Then it is sufficient to have $1 - \frac{\hat{p}(1-\hat{p})}{\sigma(\hat{p})(1-\sigma(\hat{p}))} > 0 \Leftrightarrow \hat{p} \geq 1 - \frac{\sqrt{1+\beta}-1}{\beta}$ in order to also obtain that $\frac{d\hat{p}}{dt} < 1$; otherwise, $\frac{d\hat{p}}{dt} > or < 1$. As a result $\hat{\pi} = 1 - G(\hat{p} - t)$ increases with t if $\hat{p} \geq 1 - \frac{\sqrt{1+\beta}-1}{\beta}$. Otherwise, the effect is ambiguous. Finally, given that the marginal type increases with t , it is also straightforward to see that the equilibrium offer $\hat{s}$ also increases with t . ■

In the last proposition, we denote as: $\mu = E(p)$ the mean type of the plaintiff.

Proposition 4. *A mean-preserving proportional shift in the range of plaintiff's type:*
- decreases the marginal type if $\hat{p} < \mu$; otherwise, the effect is ambiguous;
- has an ambiguous effect on the probability of trial;
- decreases (increases) the equilibrium offer if the marginal type decreases (respectively, increases).

Proof. We define (see also Bebchuk (1984)) a mean-preserving proportional shift in the range of plaintiff's types as the composition of an additive shift to the left (a $\mu(1-t)$ -translation, with $t \geq 1$ and $\mu = E(p)$) plus a multiplicative shift of plaintiff's types, such that p is now distributed in the interval $[ta + \mu(1-t), tb + \mu(1-t)]$ with a cumulative probability function $\Gamma(p)$ and a density $\gamma(p)$ satisfying the following correspondences with the primitives $G(p)$ and $g(p)$:

$$\Gamma(p) = G\left(\frac{p-\mu}{t} + \mu\right)$$
$$\gamma(p) = \frac{1}{t} g\left(\frac{p-\mu}{t} + \mu\right)$$

Once more, these two conditions characterize a family of distribution functions which is parametrized by $t \geq 1$, where $t = 1$ gives us the primitives, and $t > 1$ gives us a new distribution with the same mean $\mu = E(p)$ but which is more spread than the primitive distribution; thus it has moments of higher orders which are larger than those of the primitive. In this case, the condition (4) may be now substituted with the general formulation:

$$t \times \left(\frac{G}{g}\right)_{|\left(\frac{p-\mu}{t}+\mu\right)} = \left(\hat{p} - \sigma(\hat{p}) + \frac{C}{D}\right) \times \frac{\hat{p}}{\sigma(\hat{p})} \times \frac{1-\hat{p}}{1-\sigma(\hat{p})}$$

with $\hat{\pi} = 1 - G\left(\frac{\hat{p}-\mu}{t} + \mu\right)$. I) Differentiating (7) gives:

$$\frac{d\hat{p}}{dt} = \frac{1}{\Delta} \times \left[\left(\frac{G}{g}\right)'_{|\left(\frac{\hat{p}-\mu}{t}+\mu\right)} \times \left(\frac{\hat{p}-\mu}{t}\right) - \left(\frac{G}{g}\right)_{|\left(\frac{\hat{p}-\mu}{t}+\mu\right)} \right]$$

It is obvious that $\hat{p} < \mu \Rightarrow \frac{d\hat{p}}{dt} < 0$ although if $\hat{p} > \mu$ then $\frac{d\hat{p}}{dt}$ has an ambiguous sign. II) Similarly, $\hat{\pi}$ may decrease or increase with t since:

$$\frac{d\hat{\pi}}{dt} = -g\left(\frac{\hat{p}-\mu}{t} + \mu\right) \times \frac{1}{t} \times \left(\frac{d\hat{p}}{dt} - \frac{\hat{p}-\mu}{t}\right)$$

Hence the result. III) Given the ambiguity on the marginal type, it is also straightforward to see that the equilibrium offer $\hat{s}$ may as well increase (if the marginal type increases) as decrease (respectively if the marginal type decreases) with t. ■

Note that in the seminal paper by Bebchuk (1984) – *i.e.* for disappointment neutral plaintiffs, the additive shift in the range of types considered in proposition 3, leads to an increase in the settlement amount (because it increase the expected value to the plaintiff of a trial) but has no effect on the likelihood of a settlement (because it will not change the difference in these levels between any two given types); on the other hand, the multiplicative shift of proposition 4 has an ambiguous effect on the settlement amount but increases the likelihood of a trial (because it will increase the difference in expected outcome of a trial between any two given types). By contrast, when considering disappointment averse plaintiffs and alternative shifts in their characteristics, we obtain more ambiguous results. To sum up, as shown through the various qualitative results, it seems that the impacts of additive/uniform shifts are not easily predictable, and to the least, not more easily than those of proportional shifts. Moreover, our formal results in proposition 3 and 4 exhibit a kind of “dependency with respect to the initial equilibrium”, as reflected by the restrictions required on the initial value of the marginal type $\hat{p}$.

It is not straightforward to find out specific conclusions, as for practical purposes, in terms of policy recommendations. However, our results suggest that the issue with access to services of justice, and the design of public policies, are of major importance, although more tricky, as soon as litigants are not disappointment averse.

4. Conclusion

There is a long standing debate in experimental economics concerning the relevant interpretation of the growing evidence that people proceed with probabilities transformation or manipulation in a way not consistent with rational inference and Bayesian updating rules. For psychologists, his reflects a kind of bounded rationality due to the presence of cognitive dissonance or inconsistency, revealing that people use heuristics rather than sophisticated processes for the assessment of their beliefs. Recent research in *Law & Economics* also focus on the case with boundedly rational litigants. This paper introduces disappointment aversion as a channel for probability manipulation which at the intuitive level is the opposite perspective of Bar-Gill (2005) or Farmer and Pecorino (2002), who both relied on the self-serving bias. But disappointment aversion is captured here in a way consistent with rational behaviour – at least in the sense of a falsifiable theory based on a complete axiomatic (Gull (1991)). Note that to the extent that disappointment aversion induces also loss aversion (well documented), our paper provides results regarding also the influence of loss aversion in a judicial context. Thus our results add to the literature in several respects.

In our framework, disappointment aversion has consequences that contrast with those of the self-serving bias in Bar-Gill (2005) or Farmer and Pecorino (2002), since we obtain a larger pattern of predicted behaviours. In particular, although the self-serving bias is supposed to induce common place effects in naïve models, the index of disappointment averse seems to have more various implications here. As a result, shifts in the plaintiff's characteristics are also described as having more contrasted impacts. This suggests at least two different conclusions. First, modelling more closely what we call bounded rationality may be of great importance. Second, the empirical/experimental calibration the disappointment index is an important avenue of future research.

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APPENDIX

SECOND ORDER CONDITION. Remark that under assumption 1, the LHS in (4) is an increasing function of p . However under assumption 2, the RHS is not (necessarily) a monotonically decreasing function of p : thus, there may exist several extrema (several values of p satisfying (4) with their associated offer satisfying (2)). When this is the case, inspection of the second order condition which requires that the marginal cost of the offer increases more than its marginal benefit (or: $L''(s) \geq 0$) enables us to indentiy which ones of those extrema are local minima. This requirement is satified soon as:

$$\left(\frac{G}{g}\right)'_{|\hat{p}} + 2\left(\frac{G}{g}\right)_{|\hat{p}} \times \frac{\hat{p}-\sigma(\hat{p}))}{\hat{p}(1-\hat{p})} + \left(1-\frac{\hat{p}}{\sigma(\hat{p})}\times\frac{1-\hat{p}}{1-\sigma(\hat{p})}\right) > 0$$

at any admissible extremum $\hat{p}$. A sufficient condition is that $1-\frac{\hat{p}(1-\hat{p})}{\sigma(\hat{p})(1-\sigma(\hat{p}))} > 0$ implying that the index of disappointment aversion must be small enough or equivalently set: $\hat{p} \geq 1-\frac{\sqrt{1+\beta}-1}{\beta}$.

In FIGURE 1 ($H(p)$ stands for the RHS in (4)), there exist three extrema, but the smallest and the largest values only are two local minima while the intermediate one is a local maximum Finally, substituting each value of the admissible minimum in $L(s)$ provides us with the global minimum, which is the way we implicitly proceed in proposition 1.

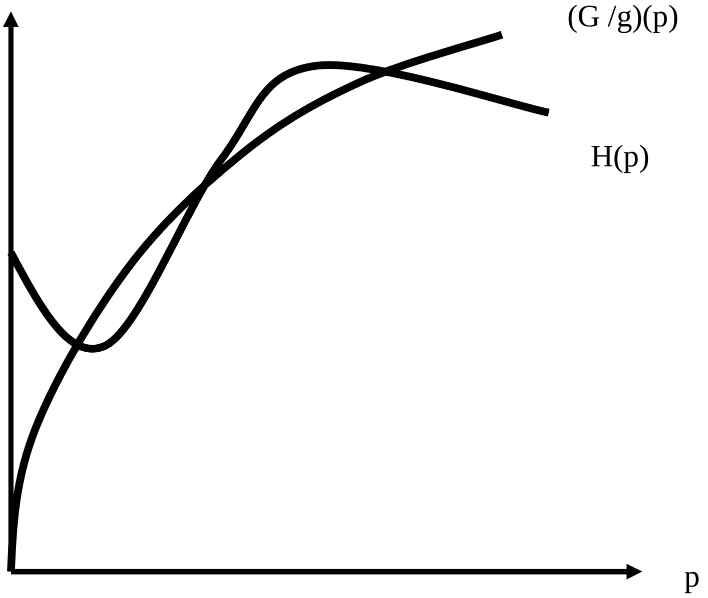

FIGURE 1