Fair Settlements in Multidefendant Torts

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Abstract

We study the fairness of legal rules for computing damages in cases with multiple defendants. Specifically, we develop a bargaining model of multidefendant litigation and compare the equilibria under different offset rules—rules that adjust the plaintiff’s trial award depending on which defendants settle. We find that the most common offset rule, the pro tanto rule, is unfair because (1) the plaintiff recovers more than the expected value of her claim and (2) each individual defendant’s expected payout bears no relation to the harm she actually caused. In contrast, the proportionate share rule (which a minority of states currently use) is fair. We further show that the proportionate share rule has the added benefit of eliminating the strategic aspect of settlement negotiations: Co-defendants’ settlement negotiations affect each other under the pro tanto rule but not under the proportionate share rule. We briefly discuss efficiency implications and the tractability of the two rules, before concluding that states should switch to the proportionate share rule.

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1 Introduction

The biggest torts inevitably pull in multiple defendants. This is true for mass torts like the BP Oil Spill, asbestos, and tobacco litigation, as well as for major financial frauds like WorldCom, Enron, and the Madoff Ponzi Scheme. The legal system faces a number of decisions in addressing these multidefendant torts.

There are two main ways in which liability is apportioned among multiple defendants: several liability (SL) and joint and several liability (JSL). In jurisdictions with SL, defendants are only liable for the damages they directly caused. In jurisdictions with JSL, every defendant is responsible for the total damages caused by all defendants. JSL jurisdictions usually also allow the defendants that were sued to seek contribution from the defendants that were not sued, either through joinder or a subsequent action. However, since many defendants settle, JSL jurisdictions face an immediate question: How should the settling defendants affect the non-settling defendants?

States answer this question by establishing an “offset rule.” The vast majority of JSL jurisdictions follow the pro tanto offset rule. Under the pro tanto rule, settlements decrease the potential damages of non-settling defendants one-for-one. For example, suppose multiple defendants caused me $d$ amount of damages. If I settle with one defendant for $s$ and litigate against the others, I get $d - s$ if I win.

In contrast, a minority of JSL jurisdictions follow the proportionate share rule. Under this rule, settlement amounts have no effect on non-settling defendants. Instead, settling defendants’ liability shares offset the non-settling defendants’ liability. To illustrate, suppose again that I settle with one defendant and take the others to trial. If the settling defendant is held liable for $x$ percent of total damages, then I get $100 - x$ percent of $d$ if I win.

In this paper, we develop a bargaining model of multidefendant litigation in order to evaluate the fairness of offset rules. We define an equilibrium as fair if, in expectation, the plaintiff is made whole and each defendant’s payment is proportional to her liability.\footnote{This definition emphasizes proportionality—of plaintiff’s recovery and defendants’ contributions—as the key element of fairness. We admit that there are many reasonable alternative definitions and that the selection among possible definitions is somewhat arbitrary. As will become clear, however, offset rules differ dramatically in their distributional consequences—and it is on these consequences that we seek to focus.} The model yields two main results: (1) the majority rule (pro tanto) is unfair because the plaintiff always enjoys...
a “double recovery” and each defendant’s payment generally does not depend on her liability and (2) the minority rule (proportionate share) is always fair. In practice, we observe many variations on these rules across states. For this reason, we also evaluate two variations on these rules. Both variations prove relatively more fair than pro tanto, but not as attractive as proportionate share.

The proportionate share rule exhibits an additional feature that is particularly attractive. Under every offset rule, each defendant’s settlement negotiations generally affect the other defendants’ payoffs. However, under the proportionate share rule—and only this rule—this effect is perfectly balanced by the offset. Put another way, if one defendant suddenly switches from litigating to settling, the net effect on any other defendant’s payoffs is zero. Each defendant is thus free to choose between an outcome that is fair ex ante (settlement) and one that is fair ex post (litigation). This is not true for the other rules because the strategic effect of each defendant’s settlement negotiations restrict the possible equilibria to certain settlement/litigation combinations (e.g., either all defendants settle or all but one defendants settle).

Our analysis yields a policy recommendation in favor of the proportionate share rule. It also suggests that much of the existing criticism of JSL and its inherent unfairness might be more precisely directed at the pro tanto rule.

Previous scholars have also studied the dynamics of litigation with multiple defendants and anticipate several of the key results of our model. Kornhauser and Revesz (1993) show that under the pro tanto rule plaintiffs receive more than their claim’s expected value if all defendants proceeded to trial and that defendants may pay more their equitable share of damages. Chang and Sigman (2007) provide a formal model of the rule in the context of environmental litigation. Kornhauser and Revesz (1994a) model the effect of JSL on the likelihood of settlement. They demonstrate that this effect depends on the correlation between plaintiff’s probability of winning against each defendant. To illustrate, suppose the plaintiff litigates against two defendants and has a 50/50 chance of winning against either one. If the outcomes were perfectly correlated, then the plaintiff either wins against both or loses against both; in this case she has a 1 in 2 chance of recovery. If, however, the outcomes were perfectly uncorrelated, then she has a 3 out of 4 chance of winning against at least one defendant, which is all it takes to recover her total damages under JSL. Thus, when the correlation is low, litigating against both defendants is like taking “two bites at the apple,” and
this will tend to encourage litigation over settlement. In the context of antitrust litigation, seminal papers by Easterbrook et al. (1980) and Polinsky and Shavell (1981) study different potential offset rules and anticipate several other results. In particular, they suggest, without use of a formal model, how equilibria differ under a pro tanto and proportionate share rule, that the proportionate share rule uniquely eliminates the strategic character of multidefendant tort litigation (as does Klerman (1996)), and that returns to plaintiff under the pro tanto rule increase with the number of defendants. Kahan (1996) further argues that low correlation might in turn encourage potential defendants to take excessive care. Subsequent scholars have extended the analysis to other contexts (Kornhauser and Revesz, 1994b; Spier, 1994; Chang and Sigman, 2000, 2007; Kornhauser and Revesz, 2000, 1989; Kornhauser and Takeda, 2007; Kornhauser and Revesz, 2009).

A key assumption behind many of these results is that plaintiff’s recovery is constant regardless of which defendant(s) lose at trial. Klerman (1996) argues that if recovery instead increased with the number of losing defendants, then the effect of JSL on settlement is weaker or non-existent. This in turn would suggest that JSL does not lead to excessive care. Carvell et al. (2012) provide empirical evidence for this in the context of health care; they find that medical agents actually exercise less care in JSL jurisdictions.

Our paper differs from most of the literature in two key ways. The first difference is the outcome of interest. The extant literature focuses on how JSL and offset rules affect (1) the likelihood of settlement and (2) the level of care. In contrast, we ask how JSL and offset rules affect the fairness of plaintiff and defendants’ payoffs. Indeed, our model largely abstracts from the settle-or-litigate decision; we find that every offset rule generates multiple equilibria that include mixtures of settlement and litigation outcomes.

A second key difference is that our approach emphasizes the collective bargaining problem among defendants as the fundamental problem in multidefendant litigation. (Though we do not demonstrate it formally, it is straightforward to see that the main results of this paper—as well as much of the literature on multidefendant torts—would not hold were defendants able to collectively bargain with plaintiff.) Our approach abstracts away from the key frictions that the previous literature has emphasized, such as litiga-

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2A closely related literature considers the reverse case of multi-plaintiff suits (class actions). Che and Spier (2008) show that an optimizing defendant follows a “divide and conquer” strategy in which she makes a sequence of settlements that are successively less generous.
tion costs, risk aversion, private information, and uncorrelated outcomes for trial defendants. Kornhauser and Revesz (1994a), for example, argue that without uncorrelated trial outcomes, the multidefendant analysis would reduce to the single-defendant case. By contrast, we find that the collective bargaining problem (which is implicit throughout the literature) is itself sufficient to distinguish the multidefendant and single-defendant settings. Thus, the problems inherent in multidefendant torts may be more robust that previously suggested. Nonetheless, while this abstraction allows us to exhibit the effects of the offset rules perspicuously, it also limits the generality of our results. Our approach also models the settle-or-trial decision dichotomously, whereas in the real-world there exists an entire continuum of potential choices to partially settle a litigation.

The rest of this paper is organized as follows. The next section reviews the offset and damages rules of multidefendant torts. Section 3 presents a model of multidefendant settlement under the pro tanto rule. Section 4 compares the fairness of the pro tanto rule with three alternatives. It also makes a policy recommendation, responds to potential objections, and provides anecdotal evidence from judicial opinions. Section 5 concludes.

2 The Law of Multidefendant Torts

This section summarizes how settlements affect non-settling defendants in JSL jurisdictions. Under JSL, each defendant can be sued for the entire amount of damages suffered by the plaintiff, regardless of a defendant’s individual share of fault. JSL governs tort liability in about half of U.S. jurisdictions, including New York, California, and Delaware. It also governs

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3See, e.g., Carvell et al. (2012); Kornhauser and Revesz (1994a). The consequences of private information in litigation are particularly well-studied in the single-defendant setting. Daughety and Reinganum (forthcoming) provide an excellent review.
4See Prescott and Spier (2016).
5As mentioned, the principal alternative to joint and several liability is several liability. Several liability limits each defendant’s liability to the portion of damages corresponding to its share of fault. Under pure several liability, there is no need for contribution or setoff rules because each defendant simply pays the portion of damages corresponding to its share of fault. See, e.g., Ga. Code §51-12-33(b) (1987); Ga. Code §51-12-33 (2005); Cavalier Convenience, Inc. v. Sarvis, 699 S.E.2d 104 (Ga. 2010).
at least some torts in the vast majority of states.\footnote{For instance, Hawaii is generally a several liability jurisdiction, but retains joint and several liability for all damages in intentional torts, strict liability suits, environmental damages cases, and noneconomic damages in personal injury suits. See Haw. Stat.\textsection 663-10.9 (1999); Kienker v. Bauer, 129 P.3d 1125 (Haw. 2006).}

There are two types of rules that determine the effect of settlement in JSL jurisdictions: contribution rules and offset rules. Contribution is the right to seek damages from a co-defendant when a defendant has paid a share of damages exceeding its share of fault. The overwhelming majority of states permit contribution among non-settling parties.\footnote{Vermont is an example of one state that does not provide joint tortfeasors with any right of contribution. Murray v. J & B Int'l Trucks, Inc., 508 A.2d 1351 (Vt. 1986).} In general, settlement alters contribution rights. In most states, settlement immunizes a defendant from contribution actions: non-settling defendants can neither seek contribution nor be sued for contribution. This preserves the finality of settlement.\footnote{See Jovovich v. Desco Marine, Inc., 809 F.2d 1529 (11th Cir. 1987) (“settling parties assume the finality and potential benefit and risk of their settlement decision”); Complaint of Taurus Marine, Inc. v. Marin Cnty., No. C 08-3195 PJH, 2012 WL 424597, at 6 (N.D. Cal. Feb. 9, 2012) (“contribution actions are not available to settling parties because settling parties assume the finality and potential benefit and risk of their settlement decisions”).}

The second type of rule is the offset rule. An offset rule determines how settling defendants affect the amount owed by non-settling defendants. There are two main varieties. The majority of JSL jurisdictions adopt the pro tanto offset rule, which reduces non-settling defendants’ damages liability by the sum of settlements.\footnote{States adopting a pro tanto joint and several liability regime include Alabama, California, Florida, Illinois, Maine, Maryland, Massachusetts, Minnesota, Missouri, New Hampshire, North Carolina, Rhode Island, South Dakota, Virginia, and Washington. For instance, Alabama applies a pure joint and several liability regime in which a defendant can be liable for 100\% of any damages regardless of the significance of its share of fault. See Keibler-Thompson Corp. v. Steading, 907 So.2d 435 (Ala. 2005); Ex parte Barnett, 978 So.2d 729 (Ala. 2007).} In contrast, a minority of jurisdictions adopt a proportionate share rule. The proportionate share rule reduces the non-settling defendants’ total liability by the sum of the settling defendants’ liability.\footnote{States adopting a proportionate share rule under joint and several liability include Connecticut, Iowa, and Nebraska. See Conn. Stat.\textsection 52-572h; Iowa Code \textsection 668.7 (1984); Thomas v. Solberg, 442 N.W.2d 73 (Iowa 1989); Neb. Stat. \textsection 25-21, 185.11 (1992); Tadros v. City of Omaha, 735 N.W.2d 377 (Neb. 2007).}
In practice, we observe several variations on these kinds of rules. For example, two states of outsized importance adopt a hybrid offset rule by which the offset is whichever is the greater of the pro tanto or proportionate share offsets.12

Each jurisdiction combines these liability, contribution, settlement, and offset rules in distinct ways, producing a bewilderingly extensive and arcane set of provisions designed to address the complexities of multidefendant torts. This unwieldy body of law has led one commentator to call the apportionment of damages among multiple tortfeasors, “the most difficult and confusing aspect of civil practice” (Kirgis, 2001).

It is worth sketching the law of one state to illustrate. Consider New York. New York is in general a JSL jurisdiction, but there are both exceptions as well as exceptions to the exceptions.13 Further, if one defendant settles, she can neither seek contribution nor be sued for contribution.14 Non-settling defendants are thus denied the ability to receive contribution from settling defendants. They do, however, receive an offset from any judgment against them at trial. The New York offset is a hybrid of the majority pro tanto and minority proportionate share rules: settlements reduce the plaintiff’s claim against any other tortfeasors by the greater of the amount of the settlement or the settling defendant’s equitable share of damages.15 These shares are assigned by a factfinder through a kind of “shadow trial,” in which the non-settling defendants call the settling defendants as witnesses to show that the

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12The two states are Delaware and New York (discussed below). See also 10 Del. Code §6301 (joint and several liability); 10 Del. Code §6304 (defining the offset for non-settling defendants); Medical Center v. Mullins, 637 A.2d 6 (Del. 1994).
13In personal injury suits, defendants are only severally liable for non-economic harm. Non-economic harm includes mental anguish, pain, suffering, and loss of consortium. See N.Y. CPLR §1600. However, an individual defendant’s liability switches back to JSL if her share of damages is over 50 percent. See Ravo v. Rogatnick, 70 N.Y.2d 305, 309-11 (1987) (establishing general conditions for joint and several liability); N.Y. CPLR §1601 (defining exception).
14N.Y. General Obligations Law §15-108(b)-(c). This is not true if settlement occurs after judgment has been entered against a defendant, which may happen if parties decide to settle after judgment, rather than one party seeking appeal. Under Section 15-108, a settlement after judgment does not qualify as a “release” for statutory purposes and so the statute’s prohibition on contribution actions by or against a settling defendant is not triggered. Rock v. Reed-Prentice Div. of Package Mach. Co., 39 N.Y.2d 34, 41 (1976).
settling defendants caused part of the damage.\footnote{In re Brooklyn Navy Yard Asbestos Litig., 971 F.2d 831, 845 (2d Cir. 1992); Matter of New York City Asbestos Litig., 188 A.D.2d 214, 224 (1st Dep’t 1993), aff’d 82 N.Y.2d 821 (1993). New York’s body of law governing these situations, like that of most states, changed enormously over the course of the twentieth century. For instance, prior to the landmark decision, Dole v. Dow Chemical Co., 30 N.Y.2d 143 (1972), by New York’s highest court, a single defendant sued by a plaintiff for a tort caused by multiple tortfeasors had virtually no recourse because no contribution right was recognized. Fox v. Western New York Motor Lines, Inc., 257 N.Y. 305 (1931). The decision in Dole changed all that, creating a right of contribution, which empowered a defendant to either implead other tortfeasors directly into a suit or to bring an independent action against them.}

In the next section, we formally model a stylized jurisdiction that exhibits the key features of (1) joint and several liability, (2) contribution among non-settling defendants, and, most importantly, (3) the majority pro tanto rule.

3 Model of Settlement under the Pro Tanto Rule

3.1 Setup

One plaintiff, \( P \), and \( n \) co-defendants play a one-shot dispute resolution game. Defendants are denoted \( D_i \), with \( i \in \{1, \ldots, n\} \). There is an insolvent defendant, \( D_0 \), who does not participate in the game. It is publicly known that each \( D_i \) caused \( \ell_i \) worth of damages to \( P \). However, because of legal uncertainty, it is not known whether the defendants are obliged to compensate \( P \). Expected payoffs are denoted \( v(\cdot) \) for plaintiff and \( u_i(\cdot) \) for defendants. An asterisk denotes equilibrium values (e.g., \( u^* \)). The index \( -i \) denotes all defendants except \( i \). Total damages are normalized to 1. All parties are risk neutral.

The dispute resolution game is as follows:

1. Offers. Each solvent defendant simultaneously submits a settlement offer, \( s_i \geq 0 \), to plaintiff.\footnote{Permitting negative offers does not affect the results.}

2. Response. Plaintiff accepts or rejects each offer by playing either \( a_i = 1 \) (to accept offer \( i \)) or \( a_i = 0 \) (to reject).
3. **Settlement.** If $P$ accepts $D_i$'s offer, $D_i$ transfers $s_i$ to $P$. If $P$ accepts all offers, the game ends.

4. **Trial.** If $P$ does not accept all offers, there is a trial. $P$ wins at trial with probability $\pi \in (0, 1)$.

5. **Damages.** If $P$ wins at trial, the trial defendants pay damages. Damages follow the pro tanto rule with contribution among non-settling defendants. Under this rule, each trial defendant, $D_j$, transfers to plaintiff

\[
\frac{\ell_j}{\sum_i (1-a_i)\ell_i} \left( 1 - \min \left\{ 1, \sum_i a_is_i \right\} \right)
\]

if plaintiff wins

\[
0 \quad \text{if plaintiff loses.}
\]

In words, the pro tanto rule is that a winning plaintiff’s damages are reduced by her total settlements, up to a maximum of total damages. The contribution right ensures that each trial defendant’s share of damages is proportional to her share of liability (relative to other trial defendants).

We are particularly interested in whether the pro tanto offset rule is *fair*. We define an offset rule as fair if two things hold in equilibrium: (1) plaintiff is made exactly whole and (2) each defendant’s payment is proportional to the damage she caused. In the context of the model, the requirements are that expected payoffs in equilibrium are

\[
v^* = \pi \quad \forall i.
\]

Finally, it will be convenient to define the *multidefendant premium*,

\[
\psi(\pi, n) = v - \pi,
\]

which is the amount by which plaintiff’s compensation, $v$, exceeds the value of her claim, $\pi$. We refer to $\psi(\cdot)$ as the multidefendant premium because
Table 1: Payoffs with 1 plaintiff and 2 defendants

<table>
<thead>
<tr>
<th>P’s action</th>
<th>Expected payoffs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$P$</td>
</tr>
<tr>
<td>Accept none</td>
<td>$v_{00} = \pi$</td>
</tr>
<tr>
<td>Accept $s_1$ and $s_2$</td>
<td>$v_{11} = s_1 + s_2$</td>
</tr>
<tr>
<td>Accept $s_1$ only</td>
<td>$v_{10} = s_1 + \pi(1 - s_1)$</td>
</tr>
<tr>
<td>Accept $s_2$ only</td>
<td>$v_{01} = s_2 + \pi(1 - s_2)$</td>
</tr>
</tbody>
</table>

it describes how having multiple defendants generates a premium or “double recovery” for plaintiff.

3.2 Two Defendants

This section first considers the case of two solvent defendants. The next section generalizes to the case of $n$ solvent defendants.

Table 1 shows how payoffs vary by each party’s action. There are four possibilities for plaintiff: accept no offers, accept $s_1$ only, accept $s_2$ only, and accept both. If plaintiff accepts no offers, she then takes both defendants to trial and receives $\pi$ in expectation. Each defendant’s share of $\pi$ is determined by inflating the amount she caused, $\ell_i$, by the amount not caused by the insolvent defendant, $1 - \ell_0$.

If $P$ accepts only $s_1$, then she gets settlement $s_1$ from $D_1$ with certainty and trial damages $\max\{1 - s_1, 0\}$ from $D_2$ with probability $\pi$. If she accepts only $s_2$, then similarly she gets $s_2$ from $D_2$ and $\max\{1 - s_2, 0\}$ from $D_1$ with probability $\pi$. Finally, if $P$ accepts both offers, she gets the settlement $s_1 + s_2$ with certainty.$^{18}$

Figure 1 graphs each party’s best response function. The first panel is plaintiff’s best response given the offer pair $(s_1, s_2)$. The payoffs listed in table 1 generate three regions over which plaintiff will either (1) accept only $s_1$, (2) accept only $s_2$, or (3) accept both. Intuitively, if the settlement offers are both very high, plaintiff will accept both and forgo trial. If one is high while the other is relatively low, plaintiff will accept the high offer and then take the other defendant to trial.

$^{18}$For conciseness, table 1 assumes the case when $1 - s_1 > 0$ and $1 - s_2 > 0$. Below we prove that this is true for equilibrium offers.
Rejecting both offers is a strictly dominated strategy for plaintiff. The intuition is that when plaintiff goes from rejecting both to accepting i’s offer, she trades off $s_i$ of probabilistic damages at trial (the offset) for $s_i$ of certain gains in settlement. Thus, accepting one offer strictly reduces the amount over which legal uncertainty discounts plaintiff’s payoff. It is worth stressing that this has nothing to do with risk aversion; all parties were assumed to be risk neutral.

The second panel of figure 1 graphs defendants’ best responses. First consider $D_2$’s best response, denoted by the solid line and right shaded area. If $D_1$ offers a zero settlement, $D_2$ can offer an arbitrarily small amount and avoid trial. In general, if $D_1$ makes a relatively low offer, $D_2$ will just slightly outbid it in order to avoid trial damages (so $s_2^* = s_1 + \epsilon$ for low $s_1$). If, on the other hand, $D_1$ makes a relatively high offer, then $D_2$ will prefer not to outbid it and will instead either go to trial or settle for expected trial damages (so $s_2^* \leq \pi(1 - s_1)$ for high $s_1$).

$D_1$’s best response function is symmetric to $D_2$’s. Importantly, this symmetry does not depend on their relative liability shares, $\ell_1$ and $\ell_2$. It only depends on the fact that both defendants are solvent. Thus, under the pro tanto rule, the distribution of liability shares among defendants plays no role in any party’s best response function.

There is one type of pure strategy equilibrium:

$$s_i^* = s_j^* = \frac{\pi}{1 + \pi}$$

$$(a_i^*, a_j^*) = (1, 1) \text{ or } (1, 0) \text{ or } (0, 1).$$

(5)

In equilibrium, defendants submit equal offers and plaintiff is indifferent between accepting one or both. Expected payoffs are the same either way:

$$v^* = \frac{2\pi}{1 + \pi}$$

$$u_i^* = \frac{-\pi}{1 + \pi}, \quad i \in \{1, 2\}.$$  

(7)

This leads to a multidefendant premium,

$$\psi^*(\pi, 2) = \pi \frac{(1 - \pi)}{(1 + \pi)} > 0.$$  

(8)
Figure 1: Plaintiff and defendants’ best response functions. Total damages are normalized to 1. \( \pi \) is the probability plaintiff wins at trial. In panel (b), \( D_1 \)'s best response is the dashed line and the dotted area on the left. \( D_2 \)'s best response is the solid line and the shaded area on the right. The black circle indicates expected payments in equilibrium.

The intuition behind the premium is that it comes from the “bidding war” among defendants as each tries to outbid the other in order to avoid trial.

### 3.3 \( n \) defendants

Next we consider the general case of \( n \) (solvent) defendants. This case is straightforward to solve if we generalize an observation from the \( n = 2 \) case. In the case of 2 defendants, it was clear that rejecting both offers is a strictly dominated strategy for plaintiff. She could always do better by accepting one and then taking the other to court. Similarly, in the general case of \( n \) defendants, rejecting more than one offer is also strictly dominated for plaintiff. This is because plaintiff’s payoffs strictly increase with each additional settlement—so as long as there remains at least one defendant to take to trial. By accepting the marginal offer, \( s_i \), plaintiff trades \( s_i \) of probabilistic gains at trial for \( s_i \) of certain gains in settlement.

There is therefore again one type of pure strategy equilibrium:

\[
\sum_i a_i^* \geq n - 1
\]

\[
s_i^* = s^*
\]
where

\[ s^* = \frac{\pi}{1 + (n - 1)\pi}. \]  

(10)

The equilibrium is analogous to the case of two defendants. Defendants submit equal offers and plaintiff is indifferent between accepting \( n \) or \( n - 1 \) offers. Expected payoffs for plaintiff and defendants are the same either way:

\[ v^* = n \cdot s^* \]  

(11)

\[ u^*_i = -s^* \quad \forall i. \]  

(12)

The multidefendant premium is

\[ \psi^*(\pi, n) = ns^* - \pi \]  

(13)

and it approaches a limiting function as the number of defendants becomes arbitrarily large:

\[ \lim_{n \to \infty} \psi^*(\pi, n) = 1 - \pi. \]  

(14)

Figure 2 shows how plaintiff’s payoffs and the multidefendant premium

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19See Appendix for proof.
vary with $n$ (the number of defendants) and $\pi$ (the strength of plaintiff’s case). There are several points of interest. Firstly, the multidefendant premium is always positive. For example, even if one defendant offered to settle for $\pi$ (the value of plaintiff’s case against all defendants), plaintiff could still take the remaining defendants to trial and collect $1 - \pi$ if she wins. The multidefendant premium thus only requires multiple defendants; it does not require any additional frictions such as litigation costs or uncorrelated trial outcomes (as in Kornhauser and Revesz (1994a)). The premium only vanishes in the single defendant game (when $n = 1$, which the model incorporates as a special case) or in the trivial cases when the trial outcome is certain ($\pi = 0$ or 1).

Secondly, plaintiff’s payoff strictly increases with both $\pi$ and $n$, but not without bound: Plaintiff’s maximum possible recovery is capped at total damages (equal to 1), and she gets this either as $\pi$ approaches 1 or as $n$ approaches infinity. The reason behind this bound is as follows. Plaintiff cannot recover more than 1 at trial (because of the pro tanto rule), so the only other possibility is that she accepts a collection of settlements that together exceed 1. However, the latter case is not an equilibrium because one defendant could then strictly lower her offer and plaintiff would still strictly prefer to accept all offers. Finally, it is worth emphasizing that each defendant’s equilibrium payment, $s^*$, never depends on her individual liability share, $\ell_i$. It only depends on the number of defendants and the strength of plaintiff’s case.

These results together demonstrate that the pro tanto rule is always unfair. Plaintiff recovers more than the value of her case and each defendant’s payment bears no relation to the damages she actually caused.

At first glance, the pro tanto rule seems like it might have been fair since plaintiff has to give up trial damages whenever she gets settlement damages. The problem is that the terms of this tradeoff (one-for-one) are not fair. A fair tradeoff would appreciate that a dollar of certain settlement damages is worth more than a dollar of probabilistic trial damages. Trial damages are worth less ex ante (i.e., before the trial) because they are discounted by legal uncertainty.

More generally, a fair offset rule would appreciate the difference between ex ante fairness and ex post fairness. Ex ante, there is legal uncertainty; plaintiff and the settling defendants bargain under this uncertainty to arrive at an ex ante fair settlement. Ex post, however, there is no legal uncertainty; after the trial, the plaintiff-defendant “bargain” collapses to either trial dam-
ages (if plaintiff wins) or zero (if plaintiff loses). The pro tanto rule misses this fact. It applies an offset that is ex ante fair (the settlements), but only when plaintiff wins ex post.

4 Designing Fair Offset Rules

The pro tanto rule leads to outcomes that could be characterized as unfair or even pathological. In equilibrium, plaintiff always recovers more than the value of her claim and defendants’ payments bear no relation to the damages they actually caused.

The natural question, then, is which rule would be fair? In this section, we compare four offset rules:

1. **Pro tanto.** If plaintiff wins, her trial damages are reduced by the sum of her settlements. This offset rule was modeled in section 3.

2. **Proportionate share.** If plaintiff wins, her trial damages are reduced by the sum of the settling defendants’ liability shares. This rule is followed by a minority of jurisdictions. It is also our preferred rule.

3. **Pro tanto with full contribution.** Same as the pro tanto rule, except non-settling defendants can also seek contribution from settling defendants.

4. **Pro tanto with symmetry.** Same as the pro tanto rule, except the offset applies regardless of the legal outcome. Thus, if plaintiff wins, her trial damages are reduced by the sum of her settlements (as in pro tanto). However, if plaintiff loses, she must return all settlements.

Several jurisdictions follow one of the first three rules. To the best of our knowledge, no jurisdiction follows rule four or in any way requires that a losing plaintiff return settlements; we are the first to formally consider this possibility. We include an analysis of the fourth rule as a way to gain intuition for why the pro tanto rule is unfair.

In the rest of this section, we formally define each offset rule and solve for its equilibria. We then offer a policy recommendation in favor of the proportionate share rule.

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20See section 2.
4.1 A Generic Offset Rule

A generic offset rule is a pair of functions, $c_j(\cdot)$ and $d_j(\cdot)$, that adjusts defendant $D_j$’s payments at trial depending on whether plaintiff wins or loses. Given an offset rule, each defendant, $D_j$, must pay to plaintiff

$$a_j s_j + (1 - a_j) \frac{\ell_j}{\sum_i (1 - a_i) \ell_i} \left[ 1 - c_j(\cdot) \right] \quad \text{if plaintiff wins}$$

$$a_j s_j - d_j(\cdot) \quad \text{if plaintiff loses.}$$

(15)

In words, if plaintiff wins, then each settling defendant pays her settlement offer while each non-settling defendant pays her relative share of offset damages. If plaintiff loses, then each defendant’s payout (if any) is further reduced by $d_j(\cdot)$. Our definition thus allows for the possibility that damages are offset even if plaintiff loses (i.e., the possibility that $d_j(\cdot) \neq 0$). This is the case in which plaintiff might, for example, return settlements if she loses.

Note that if $c(\cdot)$ or $d(\cdot)$ is written without a subscript, then the same offset applies to all defendants (as is usually the case). Also note that we continue to restrict our attention to jurisdictions with joint and several liability and contribution among trial defendants.

4.2 Four Offset Rules

4.2.1 Pro Tanto

Section 3 solved for the equilibria under this rule. To recapitulate, under the pro tauto rule, trial damages are offset by the sum of the settling defendants’ settlement amounts. The pro tauto rule fixes the offset to

$$c^{pt} = \sum_i a_i s_i$$

$$d^{pt} = 0. \quad \text{(16)}$$

The rule is unfair for all parties because plaintiff recovers more than the expected value of her claim and defendants’ payouts are not proportional to their liability shares. That is, equilibrium payoffs for plaintiff and defendants
are

\[ v^{pts} = \frac{n\pi}{1 + (n - 1)\pi} > \pi \]
\[ w_i^{pts} = \frac{-\pi}{1 + (n - 1)\pi} \neq \ell_i \quad \forall i. \tag{17} \]

### 4.2.2 Proportionate Share

Under the proportionate share rule, trial damages are offset by the sum of the settling defendants’ liability shares (rather than by their settlements). As in pro tanto, defendants’ liability shares are again inflated from \( \ell_i \) to \( \ell_i/(1 - \ell_0) \) in order to cover the insolvent defendant’s damages. The proportionate share rule thus fixes the offset to

\[ c^{ps} = \sum_i a_i \frac{\ell_i}{1 - \ell_0} \]
\[ d^{ps} = 0. \tag{18} \]

The proportionate share rule can be thought of as the “ex post fair offset” or, equivalently, as the sum of counterfactual settlements. The counterfactual settlements are the settlements that would have been reached had the settling parties known the legal outcome. Thus, if the settling defendants knew that plaintiff would win, then they would know that they will definitely pay their liability shares if they do not settle. In this case, each defendant would have been willing to settle for \( \ell_i/(1 - \ell_0) \), so the sum of the settlements would have been \( \sum a_i \ell_i/(1 - \ell_0) = c^{ps} \). If, on the other hand, the settling defendants knew that plaintiff would lose, then they would know that they will definitely pay zero at trial, so each would have been willing to settle for \( 0 = d^{ps} \).

It is straightforward to show that this is a fair rule. To see this, note that if defendant \( j \) goes to trial, then her expected payoff simplifies to her liability
share discounted by the extent of legal uncertainty. That is, if \( a_j = 0 \), then

\[
\begin{align*}
\frac{u_j^{ps}}{a_j} &= \pi \frac{-\ell_j}{\sum_i (1 - a_i) \ell_i} (1 - c^{ps}) \\
&= \pi \frac{-\ell_j}{\sum_i (1 - a_i) \ell_i} \left( 1 - \sum_i a_i \frac{\ell_i}{1 - \ell_0} \right) \\
&= \pi \frac{-\ell_j}{\sum_i (1 - a_i) \ell_i} \left( \sum_i (1 - a_i) \frac{\ell_i}{1 - \ell_0} \right) \\
&= \pi \frac{-\ell_j}{1 - \ell_0}.
\end{align*}
\] (19)

Each defendant’s payoffs are therefore not affected by her co-defendants’ settlement negotiations. The proportionate share rule is the only offset for which this is true. Proportionate share liability thus transforms each defendant’s problem from game-theoretical to decision-theoretical.

Each defendant will offer at most her expected share of trial damages:

\[
s_i^{ps} \leq \pi \frac{\ell_i}{1 - \ell_0}.
\] (20)

If defendant \( D_i \) offers her exact share, plaintiff is indifferent between accepting or rejecting the offer. If \( D_i \) offers strictly less, then plaintiff rejects the offer and \( D_i \) pays \( \pi \ell_i / (1 - \ell_0) \) in expectation at trial. The proportionate share rule therefore admits every possible combination of settlement and litigation. The rule is fair in every case because plaintiff is made exactly whole and each defendant’s payment is proportional to the damage she caused. That is,

\[
\begin{align*}
u^{ps} &= \sum_i \pi \frac{\ell_i}{1 - \ell_0} = \pi \\
w_i^{ps} &= -\pi \frac{\ell_i}{1 - \ell_0} \propto -\ell_i \quad \forall i.
\end{align*}
\] (21)

4.2.3 Pro Tanto with Full Contribution

Under pro tanto with full contribution, payoffs to the trial defendants are the same as the regular pro tanto rule, except now the losing trial defendants
can also seek contribution from the settling defendants. The legal offset is still the same as the pro tanto rule: \( \sum_i a_is_i \). However, since each settling defendant can be required to contribute up to the difference between her inflated liability share and her settlement, the effective offset becomes

\[
\begin{align*}
\mathcal{O}_{\text{ptc}} &= \sum_i a_is_i + \sum_i a_i \cdot \max \left\{ 0, \frac{\ell_i}{1 - \ell_0} - s_i \right\} \\
&= \left[ \text{regular pro tanto offset} \right] + \left[ \text{contribution from settling defendants} \right]
\end{align*}
\]

\[d_{\text{ps}} = 0.\]

It is straightforward to see that this rule also leads to fair equilibria. To see this, first note that each defendant’s payoffs are

\[
\begin{align*}
w_{i, \text{ptc}} &= \begin{cases} 
-a_is_i & \text{if } \sum_i a_i = n \quad \text{(all settle)} \\
-a_is_i & \text{if } \sum_i a_i < n, \text{w.p. } 1 - \pi \quad \text{(plaintiff loses)} \\
-\max\{s_i, \ell_i/(1 - \ell_0)\} & \text{if } \sum_i a_i < n, \text{w.p. } \pi \quad \text{(plaintiff wins)}
\end{cases}
\end{align*}
\]

Thus, if there is a trial, then positive settlement offers can only decrease a defendant’s payoff. There are therefore 2 cases:

1. **Trial.** If there is a trial, then all settlement offers are zero. Plaintiff takes at least one of the defendants to trial and gets \( \pi \) in expectation. Because of full contribution, each defendant eventually pays \( \pi \ell_i/(1 - \ell_0) \), regardless of which defendant(s) were sued.

2. **No trial.** If there is no trial, then, because the game is zero-sum, it must be that all parties are indifferent between settling and litigating. Specifically, total settlement offers cannot be less than \( \pi \) because then plaintiff could reject at least one, initiate trial, and get \( \pi \). Similarly, total settlement offers cannot be more than \( \pi \), because then at least one defendant is offering more than \( \pi \ell_i/(1 - \ell_0) \). That defendant could strictly increase her payoff by lowering her offer to \( \pi \ell_i/(1 - \ell_0) \).
The rule is fair in both cases, since

\[
\begin{align*}
    v_{\text{ptc}} &= \sum_{i \neq 0} \pi \left( \frac{\ell_i}{1 - \ell_0} \right) = \pi \\
    u_{\text{ptc}}^i &= -\pi \ell_i/(1 - \ell_0) \propto -\ell_i \quad \forall i.
\end{align*}
\]

(24)

The intuition behind this result is that pro tanto with full contribution generates a payoff structure that is very similar (though not identical) to the proportionate share rule. Specifically, if no defendant settles for more than her inflated liability share, then the payoff structures are the same so long as there is a trial (i.e., at least one offer is rejected). That is,

\[
s_i < \ell_i/(1 - \ell_0) \quad \forall i
\]

implies that

\[
c_{\text{ptc}} = c_{\text{ps}}, \quad d_{\text{ptc}} = d_{\text{ps}}.
\]

(25)

However, unlike the proportionate share rule, each defendant is not left with an independent option of settling or litigating. In equilibrium, either everyone settles or everyone litigates.

4.2.4 Pro Tanto with Symmetry

Under pro tanto with symmetry, the pro tanto rule is applied regardless of the legal outcome. Thus, if plaintiff wins, damages are offset by settlements just as in pro tanto. However, if plaintiff loses, then plaintiff must return any settlement that she made. The offset is therefore

\[
\begin{align*}
    c_{\text{pts}} &= \sum_i a_i s_i \\
    d_{\text{pts}}^i &= a_i s_i.
\end{align*}
\]

(26)

(27)

To the best of our knowledge, we are the first to consider a rule under which losing defendants must return settlements. Indeed, the label itself—"offset rule"—would suggest that if plaintiff loses, then there are no damages to "offset."\(^{21}\)

\(^{21}\)It is worth noting that there do exist other legal rules that effectively offset damages when plaintiff loses. Examples from the civil context include fee shifting rules or Rule 11 sanctions. The former requires litigation costs, which we do not model. The latter might...
We offer this offset rule as a kind of thought experiment on fairness. The idea is that the pro tanto rule chooses settlements as the offset under the intuition that these amounts represent a kind of “fair bargain.” The problem with pro tanto, however, is that the offset is selectively applied ex post; it reduces damages if plaintiff wins but not if she loses. The pro tanto with symmetry rule fixes this problem by always applying the offset, regardless of the legal outcome.

It is straightforward to see that this rule is fair for plaintiff but not for each defendant individually. To see this, first note that, if there is a trial, then plaintiff gets $\pi$ in expectation because

$$
\pi \cdot \max \left\{ 0, 1 - \sum_i a_i s_i \right\} - (1 - \pi) \sum_i a_i s_i = \pi.
$$

(28)

(This uses the result that total settlements are always less than total damages, which is demonstrated below.) Next consider three possibilities for the sum of all settlement offers:

1. $\sum_i s_i < \pi$. $P$ is indifferent between accepting or rejecting any subset of offers, so long as she rejects at least one offer. $P$ thus takes any subset of $D_i$s (except the empty set) to trial and gets $\pi$.

2. $\sum_i s_i = \pi$. $P$ is indifferent between accepting or rejecting any subset of offers. If $P$ accepts all offers, she gets $\pi$. If $P$ rejects at least one offer, there is a trial and she still gets $\pi$.

3. $\sum_i s_i > \pi$. $P$ strictly prefers to accept all offers and forgo trial. This is not an equilibrium because one $D_i$ could lower her settlement offer and guarantee a strictly higher payoff.

Thus, in equilibrium, plaintiff’s expected payoff is always $\pi$. These cases also show that any individual defendant’s payoff is essentially arbitrary. This is because plaintiff is always indifferent as to which subset she takes to trial. “Fixing” the pro tanto rule by always applying it is thus fair for plaintiff and

be modeled as a case in which the offset rule itself depends on $\pi$. For example, if plaintiff loses and $\pi$ is below some threshold minimum, then plaintiff must pay some penalty to the court or to defendant. These examples suggest that the general concept of “offsetting” damages actually encompasses a wide range of existing laws.
defendants in aggregate, but not for each individual defendant. That is,

\[ \sum_{i} u_{i}^{pts} = \pi \]

\[ \sum_{i} u_{i}^{pts} = -\pi \]

\[ u_{i}^{pts} \in [-\pi, 0] \neq -\ell_{i} \quad \forall i. \]  

(29)

4.3 Efficiency

This paper focuses on the fairness or distributive consequences of offset rules. However, offset rules will also have efficiency consequences inasmuch as they differentially affect individuals' incentives when engaging in potentially tortious behavior. We do not directly model the effect of different offset rules on primary behavior.

However, in light of previous literature, our results suggest that the proportionate share rule would incentivize defendants to take the efficient level of care ex ante, while the pro tanto rule would not. The reasoning is straightforward. Under proportionate share, the damages each defendant should expect to pay correspond exactly to the damages she caused.\(^{22}\) Under the pro tanto rule, however, the effects on ex ante incentives are mercurial, as noted by Kahan (1996) and discussed in depth by Polinsky and Shavell (1981). On the one hand, pro tanto systematically overcompensates the plaintiff, which would seemingly induce excessive care. On the other hand, since all defendants pay equal amounts in equilibrium, defendants’ payments bear no relation to the share of damages they actually caused. This would seemingly induce inefficiently low care through a collective action problem because a potential defendant is effectively responsible for only one \(\frac{1}{N}\)th of her behavior. Though these opposing effects might cancel in a knife-edge case, the general case would likely yield a tenuous and ambiguous link between a defendant’s behavior (the level of care she takes ex ante) and her expected settlement or trial payment to plaintiff. For these reasons, we conclude that proportionate share is more likely to lead to first-best levels of care than pro tanto.

\(^{22}\)This assumes the case that all defendants are solvent. A similar reasoning would hold when some defendants are insolvent.
4.4 Policy Recommendation

The immediate policy implication of our analysis is that all joint and several liability jurisdictions should adopt the proportionate share rule. The proportionate share rule is superior to both the pro tanto majority rule as well as to modified pro tanto rules.

The pro tanto rule decouples the damages a defendant must pay from the harm that the defendant caused. As a result, a defendant who is 1 percent liable pays just as much in damages as a defendant who is 80 percent liable. Under the pro tanto rule, the plaintiff also systematically receives a double recovery.

The proportionate share rule remedies both of these defects. It creates a damages system in which each defendant pays the expected value of their percentage apportionment of liability and in which the plaintiff receives the expected value of her claim. If any defendants are insolvent, then in equilibrium their shares are also proportionally covered by the solvent defendants.

The proportionate share rule is also superior to the modified pro tanto rule with full contribution rights for defendants. Both are fair (according to our criteria) but the latter achieves fairness at the cost of undoing the finality of settlements. Under the latter rule, a settling party receives a temporary reprieve from litigation, but is always subject to being pulled back into litigation if any co-tortfeasor’s payment exceeds her liability share. The proportionate share rule, on the other hand, achieves fairness while preserving the finality of settlement.

A final advantage of the proportionate share rule is that it eliminates the strategic aspect of settlement. Under both the majority pro tanto rule and the modified pro tanto with contribution rule, the decision of one defendant alters the settle-or-litigate calculus for the remaining defendants; the equilibria are either that all defendants litigate, all but one litigate, or all settle. Under the proportionate share rule, however, each individual defendant can

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23 All of these considerations are reflected in the voluminous state case law addressing the normative features of different tort damages rules. See, e.g., Williams v. Niske, 81 N.Y.2d 437, 443 (1993) (Section 15-108 is concerned “with assuring that a non-settling defendant does not pay more than its equitable share”); Schipani v. McLeod, 541 F.3d 158, 164 (2d Cir. 2008) (Section 15-108 was “enacted to ensure that non-settling tort-feasors are not required to bear more than their equitable share of liability”); Mielcarek v. Knights, 50 A.D.2d 122, 126 (4th Dep’t 1975) (“the non-settling tort-feasor [should] not be burdened with more than his equitable share because of the fact that another tort-feasor had chosen to settle.”).
base its settle-or-litigate decision on its own individual preferences, without having to take into account what fellow defendants are doing.

4.5 Objections

Some might consider it a desirable feature of an offset rule that it encourages settlement, and might for that reason be tempted to find the pro tanto rule attractive. There are two flaws with this approach. First, all of the offset rules produce equilibria with both settlement and litigation. At a basic level, it is therefore arbitrary whether any given rule will generate more or less settlement.

Second, even if pro tanto increases the likelihood of settlement under some circumstances (as previous literature has suggested),\textsuperscript{24} adopting pro tanto comes at too high a price in terms of fairness.\textsuperscript{25} It is also a roundabout route to encourage settlement. There are more targeted tools available to the legal system.\textsuperscript{26}

The pro tanto approach may be the majority rule because there is a high cost to determining liability shares. This is perhaps the most important weakness of the proportionate share rule. The pro tanto offset is already determined before trial; it requires no additional information. The proportionate share rule, by contrast, requires a fact-finder to assign percentage shares of liability, which at least in some states takes the form of a costly “shadow trial” of the settling defendants. However, since most cases settle, such costly shadow trials will be rare. Indeed, since litigation is the archetypical example of parties “bargaining in the shadow of the law,” lawmakers might do well to treat trial costs as a second-order problem and instead focus on designing rules that yield fair and efficient settlements.\textsuperscript{27}

\textsuperscript{24}See Kornhauser and Revesz (1994a), which finds that pro tanto encourages settlement when (1) there is low correlation among trial outcomes and (2) trial damages do not vary as more defendants lose.

\textsuperscript{25}Applying the pro tanto rule is analogous to continually employing the Allen or “dynamite” charge from criminal law. The Allen charge is an instruction given to a deadlocked jury by a judge that urges the jurors in the minority to revisit their beliefs and overcome their disagreement, if possible. Allen v. United States, 164 U.S. 492 (1896). This may succeed at delivering a verdict, but it does so at far too high a cost to fairness.

\textsuperscript{26}The existence of litigation costs alone acts as a powerful motivation for settlement. Judges can also encourage settlement through persuasion and case management.

\textsuperscript{27}See Mnookin and Kornhauser (1979); Cooter et al. (1982).
4.6 Anecdotal Evidence

Our model of defendant conduct under the pro tanto rule implies that if there is a trial, then only a single solvent defendant will remain in it. More broadly, the model predicts strategic behavior by both plaintiff and defendants under the pro tanto rule but not under the proportionate share rule.

There is evidence that courts have intuited some of these basic differences between the pro tanto and proportionate share rules. Some courts have remarked generally that the pro tanto rule introduces a strategic interaction that can ‘distort’ the legal process. Others have specifically suggested that pro tanto unfairly induces plaintiffs to target a single defendant—usually the deepest-pocketed (but not necessarily most-culpable) defendant. For instance, one court notes generally that “the pro tanto method leaves the field of settlement very much open to collusive arrangement between a plaintiff and a favored joint tortfeasor.” 28 Another notes specifically that “the pro tanto method . . . allows plaintiffs to target deep-pocket defendants, and fund such litigation through ‘war chests’ created by settlements with more culpable parties purportedly unable to pay their fair share of damages.” 29 Yet another remarks that under “the pro tanto method . . . [a] plaintiff can settle rather cheaply with some of the defendants, in return for their assistance in prosecuting the plaintiffs’ case against the remaining defendants, i.e., those with deeper pockets.” 30

By contrast, at least one court has suggested that the proportionate share rule allows joint and several liability to proceed without such concerns. Specifically, unlike the pro tanto rule, the proportionate share rule “prevents the plaintiffs from engaging in a collusive settlement with a party who faces high liability to force a defendant with minor culpability from being ‘left holding the bag.’ ” 31 Although anecdotal, these remarks are consistent with the model’s predictions of settlement behavior under the pro tanto versus proportionate share rules.

28 In Re Masters Mates & Pilots Pension Plan, 957 F.2d 1020, 1029 (2d Cir. 1992).
30 Fluck v. Blevins, 969 F. Supp. 1231, 1234 (D. Or. 1997); see also Kaypro Corp., 884 F.2d 1222, 1230 (9th Cir. 1989), cert. denied, 498 U.S. 890 (1990) (under the pro tanto approach “plaintiffs could affect low settlement with defendants who had limited resources, and thereby force wealthier defendants to pay more if all parties proceeded to trial”)
5 Conclusion

This paper developed a bargaining model of multidefendant settlement in order to evaluate the fairness of “offset rules.” In jurisdictions with joint and several liability (JSL), these rules are necessary to compute trial damages for cases in which some defendants settle.

The model showed that the pro tanto rule, which most JSL states follow, is unfair because it generates equilibria in which plaintiff recovers more than the value of her claim and each defendant’s payment bears no relation to her share of fault. By contrast, the model also demonstrated that the proportionate share rule, which a minority of states follow, generates fair outcomes. We therefore conclude that JSL states should adopt the proportionate share rule.

References


A Appendix

Proof of equilibrium with \(n\) defendants. Note that there are only two strategies there are not strictly dominated for plaintiff: (A) accept all offers or (B) accept all but the lowest offer. Because of this, all defendants will make the same bid in equilibrium. Otherwise, at least one defendant could strictly increase her payoff by just outbidding the lowest offer. Further, plaintiff will be indifferent between (A) and (B) in equilibrium. The reasoning is as follows. If plaintiff strictly preferred (A), then all defendants could strictly increase their payoff by strictly lowering their bids. If, on the other hand, plaintiff strictly preferred (B), then the one defendant that is chosen for trial has a lower expected payoff than the settling defendants. Denote this difference \(\Delta\). Then the lone trial defendant would respond by just slightly outbidding the others defendants (who all offered the same as her) by something less than \(\Delta\). The other defendants would respond by respectively increasing their bids. The “bidding war” would iterate until plaintiff is finally indifferent between (A) and (B). This leaves a system of \(n\) equations:

\[
    s_i^* = \pi \left( 1 - \sum_{j \neq i} s_j^* \right) \quad \forall i. \tag{30}
\]

which implies

\[
    s_i^* = \frac{\pi}{1 + (n - 1)\pi} \quad \forall i. \tag{31}
\]