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Implementing Aggregation in Law: The Median Outcome Rule

In multiple-claim lawsuits, courts tend to address each claim separately, thereby disregarding valuable information about the defendant's misconduct that might be gained by considering claims together. Ignoring that information may lead to the misalignment of liability with wrongdoing. To avoid such distortion, Ariel Porat and Eric Posner have argued in The Yale Law Journal that courts should adjudicate multiple-claim lawsuits in the aggregate. They do not specify the method to implement this novel idea, however, leaving it susceptible to several complications that might undermine its merits. To deal with these potential complications, this Essay introduces the concept of the "median outcome rule."

INTRODUCTION

In their recent article *Aggregation and Law*,¹ Ariel Porat and Eric Posner suggest that courts should aggregate—that is, combine distinct legal claims when determining a defendant's liability—more openly and consistently than they currently do. Although the authors briefly describe several possible ways to calculate an aggregated remedy, they do not offer a clear vision of *how* courts should implement aggregation.

This Essay proposes a doctrine, the "median outcome rule," to guide the implementation of what Porat and Posner call "factual" aggregation in civil suits for damages. Any other implementation method, I argue, is bound to induce at least one of the following problems: inconclusive remedial outcomes, incompatibility with the preponderance-of-the-evidence standard, and distortion of litigants' incentives. This Essay does not seek to contribute to the debate over whether, and when, courts should aggregate in civil disputes.

1. Ariel Porat & Eric A. Posner, *Aggregation and Law*, 122 YALE L.J. 2 (2012).

What I offer is a clear prescription for *how* courts that choose to aggregate claims under the preponderance standard should do so.

The Essay proceeds in five Parts. Part I examines the challenges of implementing factual aggregation. Part II describes and illustrates the mechanics of the median outcome rule. Part III explains how the doctrine addresses the challenges noted in Part I. Part IV then addresses potential objections to the median outcome rule based on issues of arbitrariness and impracticality, and Part V concludes.

I. THE CHALLENGES OF AGGREGATION IN PRIVATE LAW

Porat and Posner expose a flaw in the law as it is currently practiced. They demonstrate that, in a variety of fields, courts refrain from aggregating factual information across distinct legal claims and accordingly disregard valuable information about the likelihood of a defendant's wrongdoing.² A simple, paradigmatic example illustrates this argument:

Example 1: The plaintiff files two independent claims against the defendant: claim A, for \$200, and claim B, for \$100. Each claim has a 40% probability of being valid.

In practice, courts evaluate each claim without reference to the other. For the plaintiff to establish liability, either claim *A* or claim *B*, standing alone, must satisfy the preponderance-of-the-evidence standard. In Example 1, since each claim's probability for being valid falls short of 50%, courts would typically dismiss both claims.

However, as Porat and Posner argue, the court in Example 1 might assign liability if it assessed the validity of both claims in conjunction. The probability that claim *A* is invalid is 60%, and the same is true for claim *B*. Accordingly, the probability that both independent claims are invalid is $60\% \times 60\% = 36\%$. Hence, the probability of the complementary event—that *at least one* of the claims is valid—is 64%. Porat and Posner call this method of combining the probabilities of distinct legal claims “factual” aggregation.³ Since a 64% probability is above the required 50% threshold, factual aggregation in Example 1 arguably supports finding the defendant liable to some degree.

2. *See id.* at 7-8. The authors also discuss a different kind of aggregation altogether, “normative” aggregation, which entails combining the degrees of wrongdoing that several legal claims establish with certainty, rather than multiplying the validity probabilities of various legal claims. *See id.* at 6. This Essay does not address normative aggregation.

3. *Id.* at 5.

Although the fundamental logic of factual aggregation is appealing, there are three significant problems with its implementation. The first problem stems from the potential for inconclusive remedial outcomes. As the paradigmatic example above demonstrates, aggregation can leave unclear whether the defendant is liable for claim *A*, claim *B*, or both. Consequently, and more importantly, it can also leave unclear how much compensation should be paid: \$100, \$200, \$300, or something in between.

The second implementation hurdle arises from the competing ways in which the plaintiff and defendant might employ the preponderance-of-the-evidence threshold to narrow the range of appropriate remedies. In Example 1, the plaintiff can argue that she is entitled to compensation in an amount between \$100 and \$300, since, as established earlier, she has proven by a preponderance of the evidence—64%, to be precise—that the defendant is liable for at least one of the claims. The plaintiff might then argue for \$200 as a fair remedy, a simple average of both possibilities. (There are, of course, several other plausible methods to aggregate the possible remedies.)

The defendant, however, can argue that she is liable for only \$0 to \$100 by making a different preponderance showing, using an aggregation-based argument similar to the plaintiff's. The probability that the defendant is not liable at all is 36%, and the probability that the defendant is liable only for claim *B*, which would create liability of \$100, is 24%.⁴ Therefore, aggregating both outcomes establishes by a preponderance of the evidence—60%, to be precise—that the plaintiff's compensation cannot exceed \$100. The defendant might then argue, by the same simple-average logic, that \$50 is the fair remedy.

Clearly, those arguments for the plaintiff and defendant are inconsistent with each other. The adoption of either party's position would almost inevitably require the rejection of a valid, preponderance-based argument by the other party. Such disputes complicate a court's choice of aggregated remedy.

The third difficulty relates to incentive distortion. Suppose that the court in Example 1, along the line of the plaintiff's contention, decides that the defendant should be held liable for either claim *A* or claim *B*—but not for both, as the 16% probability of that outcome⁵ is much below the preponderance threshold. Accordingly, assume further that the court creates an aggregated remedy by averaging the values of the two equally probable claims, and so awards the plaintiff \$150. A rational defendant who expects this result might improve her position by adopting a simple yet counterintuitive strategy: assume liability for claim *B*, thus granting it a 100% probability of being valid.

4. Respectively, $0.6 \cdot 0.6 = 0.36$ and $0.4 \cdot 0.6 = 0.24$.

5. $0.4 \cdot 0.4 = 0.16$.

If the defendant adopts this strategy, the probability that at least one of the claims is valid is, of course, 100%. Nevertheless, the probability that both claims are valid becomes 40%,⁶ which is still below the preponderance threshold. Thus, as before, the plaintiff cannot win both claims—only one. This time, however, the court might simply award damages for claim *B* rather than split the difference between the two claims, because the probability of claim *B* being valid is 100%, whereas previously both claims were equally probable. Were the court to take that approach, the defendant would be liable for \$100 rather than \$150, and he would be better off assuming liability for a given claim than denying it. Clearly, that behavior would be perverse for a defendant, particularly if the defendant were innocent of the wrongdoing that claim *B* alleged.

The plaintiff's incentives, too, may be distorted by an improper aggregation. Consider a modified version of Example 1:

Example 2: The plaintiff files two independent claims against the defendant: claim A, for \$200, and claim B, for \$100. Each claim has a 60% probability of being valid.

Without aggregation, the plaintiff would win both claims. With aggregation, however, the probability that both claims are valid is only $60\% \times 60\% = 36\%$. Thus, the most the plaintiff can prove is that either claim *A* or claim *B*—but not both—is valid. Accordingly, a court might award the plaintiff an aggregated remedy between \$100 and \$200. Suppose, as before, that since both claims are equally probable, the court decides to split the difference between them, awarding the plaintiff \$150. A rational plaintiff who expects this result will drop claim *B*, pursue only claim *A*, and collect \$200. The plaintiff would be better off forgoing a legitimate claim than pursuing it—another result that can be considered perverse.

II. DEFINING THE MEDIAN OUTCOME RULE

This Part explains the mechanics of the median outcome rule. To help the reader visualize the process, and to demonstrate how judges and juries might think about applying the doctrine, Section II.A constructs tables of potential outcomes based on Examples 1 and 2. Section II.B then defines the median outcome rule and consults the tables in determining the median outcomes for Examples 1 and 2.

6. $1.0 \cdot 0.4 = 0.4$.

IMPLEMENTING AGGREGATION IN LAW

A. Constructing Tables of Potential Outcomes

In order to implement the median outcome rule, a judge or jury might first rank all possible outcomes of the lawsuit in ascending order of monetary value and then assess the probability of each outcome being valid.⁷ In Example 1, there are four possible outcomes: (1) claims *A* and *B* are invalid; (2) claim *B* is valid but claim *A* is invalid; (3) claim *A* is valid but claim *B* is invalid; and (4) claims *A* and *B* are valid. We have already derived the probabilities of most of these outcomes. Filling in the remaining figures, we obtain the following result:

Table 1.

OUTCOME NO.	1	2	3	4
LIABILITY	None	<i>B</i>	<i>A</i>	<i>A</i> and <i>B</i>
DAMAGES	\$0	\$100	\$200	\$300
PROBABILITY	36%	24%	24%	16%

In Example 2, the four possible outcomes are identical, but because the probability of each claim is 60% instead of 40%, the probabilities of some of the outcomes are different:

Table 2.

OUTCOME NO.	1	2	3	4
LIABILITY	None	<i>B</i>	<i>A</i>	<i>A</i> and <i>B</i>
DAMAGES	\$0	\$100	\$200	\$300
PROBABILITY	16%	24%	24%	36%

7. These instructions may seem a bit technical. (I discuss a “softer” implementation of the median outcome rule in Section IV.B.) Nevertheless, this description is crucial to understanding the essence of the doctrine. As is the case for any other implementation of economic analysis of the law, it can be argued that judges and juries that correctly implement the preponderance-of-the-evidence rule behave “as if” they follow such instructions. Cf. MILTON FRIEDMAN, *The Methodology of Positive Economics*, in *ESSAYS IN POSITIVE ECONOMICS* 3, 21 (1953) (discussing the “economic hypothesis that under a wide range of circumstances individual firms behave *as if* they were seeking rationally to maximize their expected returns . . . and . . . knew the relevant cost and demand functions”).

B. Defining and Determining the Median Outcome

The median outcome is best described as the middle result in terms of likelihood. Formally, the median outcome satisfies two conditions⁸:

- (1) $\text{Probability}(x \geq \text{median}) > 50\%$
- (2) $\text{Probability}(x \leq \text{median}) \geq 50\%$

The variable x represents possible outcomes ranked above the median or below it, respectively. These two conditions correspond to the competing preponderance-based arguments that the plaintiff and defendant could make. The median, in other words, is the intersection between the ranges of possible compensation to which each of the two litigants could show the plaintiff is entitled by a preponderance of the evidence. (Note that, if the probability of any single outcome is more than 50%, then it, by definition, must be the median.)

In Example 1, the median is outcome 2, “claim B is valid but claim A is invalid.” Table 1 helps to demonstrate why this is true. Starting with outcome 2 and moving right across the table, the aggregate probability of outcomes 2, 3, and 4 is the sum of the probabilities of these distinct events, 64%. This figure meets the preponderance threshold from the plaintiff’s perspective, and so outcome 2 satisfies the first condition of the median outcome rule. Starting with outcome 2 and moving left across the table, the aggregate probability of outcomes 2 and 1 is the sum of the probabilities of these distinct events, 60%. This figure also meets the preponderance threshold from the defendant’s perspective, and so outcome 2 satisfies the second condition of the median outcome rule. Hence, outcome 2, with its award of \$100 in compensation, meets both conditions. The median outcome remedy, predictably, is the *only* overlap between the ranges of compensation for which the plaintiff and defendant could argue based on the preponderance rule.

In Example 2, the median is outcome 3, “claim A is valid but claim B is invalid.” The aggregate probability of outcomes 3 and 4 is 60%, whereas the aggregate probability of outcomes 3, 2, and 1 is 64%. Accordingly, outcome 3

8. The term “median” suffers a slight distortion in this context. Strictly speaking, the median event is defined by the following conditions:

- (I) $\text{Probability}(x \geq \text{median}) \geq 50\%$
- (II) $\text{Probability}(x \leq \text{median}) \geq 50\%$

However, my definition revises the first condition to reflect the fact that the plaintiff must prove his case by a probability of *more than* 50%.

satisfies both conditions of the median outcome, and the plaintiff should receive \$200 in damages.

III. JUSTIFYING THE MEDIAN OUTCOME RULE

The median outcome rule is a compelling way to implement factual aggregation because it successfully handles the three implementation problems described in Part I: inconclusiveness of remedial outcomes, incompatibility with the preponderance-of-the-evidence rule, and distortion of litigants' incentives.

A. Conclusive Remedial Outcomes

First, for cases like Example 1, the median outcome rule eliminates inconclusiveness entirely. The matter of the defendant's liability is determined unequivocally: she is liable for claim *B* but not for claim *A*. Consequently, no inconclusiveness remains regarding the size of the compensation award, either.

Is this a generalizable result? The answer is yes, with respect to the compensation level. The median outcome rule ranks all possible outcomes by monetary value and isolates a single outcome. Thus, by definition, this procedure always identifies a specific level of compensation.⁹

The same level of clarity will not always be available, however, with respect to the particular claim for which the defendant is liable. In cases where two claims carry the same damages award, for example, the particular claim that supports liability may remain unclear, even if the amount of liability is unequivocal. Consider the following case:

Example 3: The plaintiff files two independent claims against the defendant: claim A, for \$100, and claim B, for \$100. Each claim has a 40% probability of being valid.

9. Note that the true definition of the median, *see supra* note 8, might not identify a unique result in discrete distributions where the number of probable outcomes is finite. Assume, for instance, that a plaintiff files a single claim for \$100 in damages (the amount is not in dispute, only whether the defendant is liable for the underlying claim). Assume further that there is exactly a 50% chance that the defendant is indeed liable. The two possible compensation levels, \$0 and \$100, both meet the true definition of the median. This cannot be the case, however, when using the revised definition of the median outcome established by conditions (1) and (2) in the text. Only \$0 meets this revised definition, since the \$100 result does not satisfy the first condition of the median outcome, which embodies the plaintiff's burden of proof: $\text{Probability}(x \geq \text{median}) > 50\%$.

Table 3 describes the outcomes of Example 3 and their likelihoods:

Table 3.

OUTCOME NO.	1	2	3	4
LIABILITY	None	A/B	B/A	A and B
DAMAGES	\$0	\$100	\$100	\$200
PROBABILITY	36%	24%	24%	16%

Note that outcomes 2 and 3 may suggest that the defendant is liable for claims *B* and *A*, respectively. But, alternatively, those outcomes may instead suggest that the defendant is liable, respectively, for claims *A* and *B*. Although the median outcome is clearly 2 and the plaintiff is entitled to \$100, the particular claim that supports that award remains ambiguous. Determining a level of compensation in such cases, however, is arguably more important than identifying the “real” cause of the plaintiff’s injury.¹⁰ In fact, the next Part discusses cases where it may be *desirable* to preserve some degree of inconclusiveness regarding the claim on which a court bases liability.

Naturally, alternative methods could also solve the problem of inconclusiveness. Porat and Posner mention several such options, including awarding the plaintiff the smallest remedy, the largest remedy, or a weighted average of all remedies.¹¹ Such alternatives fail, however, to meet one or both of the remaining implementation challenges.

B. The Preponderance Standard Upheld

The median outcome is the only outcome that satisfies the preponderance standard as both the plaintiff and defendant might apply it. Any compensation lower than the median outcome would violate the preponderance standard

10. Cf. Porat & Posner, *supra* note 1, at 10-11 (discussing an analogous phenomenon, “within-ement” factual aggregation, by which courts might find fault or causation in a negligence suit without identifying the particular wrongful act committed by the defendant).

11. *Id.* at 14. Although calculating an aggregated remedy using a weighted average would resemble the formulation of a remedy under the “probabalistic recovery rule,” there is a critical difference between the two approaches to liability: the probabalistic recovery rule does not require proof of *at least one claim* by a preponderance of the evidence before calculating a weighted-average remedy, whereas aggregation does. *See id.* at 18.

because the plaintiff could prove with a probability above 50% that she deserves at least the median outcome compensation (condition (1) of the median's definition). Any award higher than the median outcome would violate the preponderance standard because the defendant could prove with a probability of at least 50% that she is liable for no more than the median outcome compensation (condition (2) of the median's definition). Therefore, not only does the median outcome always satisfy the preponderance standard, but also any outcome that is not the median always violates the preponderance standard.

Take, for instance, the possibility of awarding the plaintiff a weighted average of all remedies. In Example 1, the plaintiff would win \$120 under this approach; in Example 2, the plaintiff would receive \$180; and in Example 3, the plaintiff would win \$80.¹² In all of these examples, the median outcome rule produces a different damages award: \$100 instead of \$120 in Example 1, \$200 instead of \$180 in Example 2, and \$100 instead of \$80 in Example 3. Consequently, in each case either the defendant or the plaintiff could argue persuasively that the weighted-average award violates the preponderance standard. In Example 1, the defendant would make this argument, as the weighted average exceeds the median outcome. In Examples 2 and 3, the plaintiff would make a similar argument, as the weighted average falls short of the median outcome.¹³

In fact, versions of the median outcome rule might be necessary to avoid violating the preponderance standard even in cases that do not involve aggregation. Assume, for instance, a single-claim case in which the defendant is certainly liable, but in which the extent of the injury suffered by the plaintiff is unclear except for the opinions of three equally qualified and unbiased experts. The three experts conclude, respectively, that the plaintiff has suffered a loss of \$100, \$200, and \$600. What is the appropriate level of compensation to the plaintiff?

The intuitive approach would probably be to average out the opinions of all experts, and thus to award the plaintiff \$300 in compensation. Although this approach may seem plausible, it arguably violates the preponderance standard. Because each expert is equally qualified and unbiased, we might assign a probability of one third to the validity of each expert's claim. There would then

12. The calculations are as follows: for Example 1, $(0.36 \cdot 0) + (0.24 \cdot 100) + (0.24 \cdot 200) + (0.16 \cdot 300) = 120$; for Example 2, $(0.16 \cdot 0) + (0.24 \cdot 100) + (0.24 \cdot 200) + (0.36 \cdot 300) = 180$; and for Example 3, $(0.36 \cdot 0) + (0.24 \cdot 100) + (0.24 \cdot 100) + (0.16 \cdot 200) = 80$.

13. In Example 3, implementing the weighted-average remedy reveals yet another logical flaw in this method. Aggregation suggests that *at least* one of the claims is valid, whereas the weighted-average approach awards the plaintiff a lower amount than either of the claims.

be a two-thirds chance that the plaintiff suffered a loss of \$200 or less, rendering a \$300 reward unacceptable under the preponderance standard.

On the other hand, there is also a two-thirds chance that the damages owed to the plaintiff are \$200 or more. Clearly, then, an award of less than \$200 would also violate the preponderance standard. The median outcome rule solves this puzzle by selecting the *only* outcome that will never violate the preponderance standard—in this example, \$200. Hence, the median outcome rule is the only method that is compatible with the preponderance standard, regardless of the issue of aggregation.

C. Undistorted Incentives

Finally, the median outcome rule avoids distorting incentives for litigants. In Example 1, the median outcome rule would award the plaintiff \$100. No strategic admission of liability by the defendant could reduce this figure. Even if the defendant were to concede liability for the more minor claim *B*, rendering it valid with a probability of 100%, the median outcome would remain unchanged.¹⁴ In contrast, as demonstrated earlier, were a court to calculate an aggregated remedy by splitting the difference between the damages awards for claims *A* and *B*, or award the plaintiff damages according to the largest-remedy method, the defendant would be better off conceding claim *B*, regardless of actual wrongdoing.

In Example 2, the median outcome rule finds the defendant liable for \$200, leaving litigants' incentives similarly undistorted. No strategic abandonment of a less valuable claim could increase the plaintiff's damages award. If the plaintiff were to forgo claim *B*, her compensation would not change. Again, this is not true for any of the other methods of implementing aggregation. According to the smallest-remedy method, for example, the defendant in Example 2 should pay \$100. However, if the plaintiff were to forgo claim *B* and pursue claim *A* alone, she could guarantee herself \$200 in compensation.

Does this feature of the median outcome rule always hold? The answer is again yes: the median outcome will *never* distort either party's incentives. The key to understanding this property of the median outcome rule is as follows. Consider any set of *N* aggregated claims. According to the argument offered here, the plaintiff should be awarded the median level of compensation,

14. The defendant's admission of liability *would* alter the probabilities of the four possible outcomes. The new probabilities would be: 0% (neither claim is valid), 60% (claim *B* is valid, claim *A* is invalid), 0% (claim *B* is invalid, claim *A* is valid), and 40% (both claims are valid). As before, however, the median outcome remains "claim *B* is valid, claim *A* is invalid."

represented by $M(N)$. Now assume that an additional claim for damages worth $\$y$ is added to the mix. The compensation entailed by the new median outcome is $M(N + 1)$.

Crucially, aggregating $N + 1$ claims according to the median outcome rule can never reduce the compensation to the plaintiff below $M(N)$. Simply stated, pursuing an additional marginal claim cannot make the plaintiff worse off. That condition ensures that the plaintiff cannot be better off forgoing claims than pursuing them. Furthermore, aggregating $N + 1$ claims according to the median outcome rule cannot increase compensation above $M(N) + y$, which is the compensation level if the marginal claim is accepted in its entirety. That condition, in turn, ensures that the defendant cannot be better off conceding liability than contesting it.¹⁵

IV. RECONCILING THE MEDIAN OUTCOME RULE WITH ISSUES OF ARBITRARINESS AND IMPRACTICALITY

Despite the clear advantages of the median outcome rule as a method for implementing aggregation, it raises two new potential problems: arbitrariness and impracticality. In this Part, I explain these potential problems and make suggestions for how courts employing the median outcome rule should deal with them.

15. Formally, these conditions are, respectively:

$$\begin{aligned} \text{(III)} \quad & M(N + 1) \geq M(N) \\ \text{(IV)} \quad & M(N + 1) \leq M(N) + y \end{aligned}$$

The intuition is straightforward. Assume that the marginal claim is for $\$y$ and that the probability of its validity is p . If it is the worst possible claim ($p = 0\%$), the probabilities and compensation levels of all original outcomes remain unchanged, and so does the median outcome. This is the lower limit for the new median outcome. If, on the other hand, that last claim is the best possible claim ($p = 100\%$), the probabilities of all original outcomes remain unchanged, but the amounts of compensation entailed by each outcome, including the median outcome, shift upward by $\$y$. This is the upper limit for the new median outcome. Hence, conditions (III) and (IV) apply. It should be noted that the weighted-average method, if applied correctly, also satisfies both conditions. As this Essay explains, however, it violates the preponderance standard and may also suffer from other implementation problems.

A. Arbitrariness

1. Distinguishing Between Claims of Different Plaintiffs

In Example 1, as discussed above, the median outcome rule isolates a conclusive result in terms of both liability and the amount of compensation. Nonetheless, the only reason that the rule validates claim *B*, but not claim *A*, is that the former entails a smaller damages award. The claims are otherwise identical, with the same probability of being valid. In Example 2, the opposite is true: the rule validates claim *A* simply because it entails a larger award. Arguably, there is something arbitrary about a rule of decision that distinguishes between claims – and decides which of them is valid and which is not – merely according to the damages that follow from them.

Insofar as aggregated claims are commensurable and made by a single plaintiff, distinguishing between those claims based on their monetary value seems relatively harmless.¹⁶ But if claims are aggregated across plaintiffs, a possibility that Porat and Posner explore,¹⁷ this phenomenon becomes more problematic. Consider the following example, which adapts Example 1 to a two-plaintiff format:

Example 4: Two plaintiffs, A and B, file independent claims against the same defendant, for \$200 and \$100, respectively. Each claim has a 40% probability of being valid.

Aggregation across plaintiffs implies that the defendant should be held liable for the damages of at least one of the plaintiffs. The median outcome rule replicates the results detailed for Example 1: plaintiff *B*'s claim succeeds and she wins \$100, while plaintiff *A*'s claim is dismissed.

That result is arbitrary. Each plaintiff has proven her claim to the same degree of persuasion, namely 40%. Yet plaintiff *A*'s claim is dismissed simply because it would entail a larger damages award.¹⁸ Furthermore, claim *B* is accepted only because it was aggregated with claim *A*. If plaintiff *A* can expect her claim to be dismissed in this scenario, however, she will have no incentive to join plaintiff *B*'s suit against the defendant, and no aggregation will be

16. See *supra* note 10 and accompanying text.

17. See Porat & Posner, *supra* note 1, at 6-7.

18. An even bigger distortion may arise if we slightly change the terms of Example 4, such that plaintiff *A*'s claim is valid with a probability of 45% – that is, *higher* than the likelihood that plaintiff *B*'s claim is valid. Even in this case, claim *B* would be considered the median outcome.

possible. In this way, the arbitrary element of the median outcome rule could deter plaintiffs from cooperating and thus allow a defendant to escape liability for wrongdoing.

In order to prevent this kind of arbitrariness, we must slightly modify the median outcome rule, accepting a certain, low level of inconclusiveness regarding liability. Specifically, plaintiffs *A* and *B* must share any outcome of the lawsuit, whatever the outcome may be. Applied to Example 1, this approach would mean three possible outcomes instead of four: (1) both claims are invalid; (2) only one unspecified claim is valid; and (3) both claims are valid. Table 4 summarizes the preliminary stage of the median outcome rule as applied to Example 4:

Table 4.

OUTCOME NO.	1	2	3
LIABILITY	None	Either <i>A</i> or <i>B</i>	<i>A</i> and <i>B</i>
DAMAGES	\$0	\$100-\$200	\$300
PROBABILITY	36%	48%	16%

This approach, albeit somewhat inconclusively, eliminates the specter of an arbitrary distinction between the parties, when combined with some division of damages between the two plaintiffs.¹⁹ In this example, the median is outcome 2, namely, “the defendant is liable for either claim *A* or claim *B*.”

While this approach to interplaintiff aggregation renders the median outcome less determinate as to which underlying claim supports liability, the law already permits results that are comparably indeterminate. Under the alternative liability doctrine, for example, if a plaintiff sues several defendants and proves that at least one of them is liable for the plaintiff’s damages, but fails to establish which defendant is liable because of certain evidentiary limitations, courts hold all defendants presumptively liable and shift the burden to them to prove otherwise.²⁰ Similarly, the market share liability

19. This Essay does not take up the ancillary question of how the award should be divided between the two plaintiffs.

20. The alternative liability rule was originally expounded in *Summers v. Tice*, 199 P.2d 1 (Cal. 1948), and was later adopted by the *Restatement*. See RESTATEMENT (SECOND) OF TORTS § 433B(3) (1965); see also Porat & Posner, *supra* note 1, at 12-13 (discussing the alternative liability rule).

doctrine allows the court to hold several defendants liable for damages, in proportion to their shares of a given market, even when it is impossible to distinguish which defendant is actually responsible for harming which plaintiff or plaintiffs.²¹ In these cases, the law accepts a heightened degree of indeterminacy regarding the role of particular defendants to ensure that liability attaches to wrongdoing. The modified median outcome rule for interplaintiff aggregation entails a similar type of indeterminacy, regarding plaintiffs instead of defendants, for the same end.²²

A tolerable reduction in conclusiveness as to liability thus solves the problem of arbitrariness. However, the median outcome then appears to become inconclusive regarding the size of the damages award. The defendant is liable for either claim *A* or claim *B*. Since the injuries suffered by the plaintiffs are heterogeneous, it is unclear how much compensation the defendant should pay—\$100, \$200, or something in between.

I submit that the amount of compensation awarded to the plaintiffs should be exactly what it would have been under the *standard* median outcome rule. In Example 4, therefore, the plaintiffs should jointly be awarded \$100 (exactly as in Example 1). The reason for this choice is that, as in Example 1, any other level of compensation might distort the defendant's incentives. If the plaintiffs were expected to recover more than \$100, the defendant would assume liability for claim *B* in the hope of reducing liability to \$100. Similarly, in a multiplaintiff version of Example 2, departing from the standard median outcome when determining the level of compensation would risk distorting the plaintiffs' incentives, perhaps encouraging them to strategically drop one of the two claims to increase their expected recovery.²³

21. The precedent for market share liability was established by the California Supreme Court in *Sindell v. Abbott Laboratories*, 607 P.2d 924 (Cal. 1980). See Porat & Posner, *supra* note 1, at 26-27.

22. Porat and Posner also recognize the possibility of allowing some plaintiff-side indeterminacy for the purposes of aggregation, focusing on mass-tort cases. See Porat & Posner, *supra* note 1, at 26; see also *id.* at 26 n.53 (referring to the well-known case *In re "Agent Orange" Prod. Liab. Litig.*, 597 F. Supp. 740 (E.D.N.Y. 1984), *aff'd*, 818 F.2d 145 (2d Cir. 1987)).

23. Although such strategic claim-dropping would formally remove one of the plaintiffs from the suit, the two plaintiffs would presumably have negotiated a private agreement to split any money subsequently awarded.

2. *Ordering Outcomes According to Monetary Value Rather Than Moral Fault or Other Factors*

Critics might also argue that the use of compensation level to order potential outcomes, rather than another factor such as moral fault, reflects a distinct type of arbitrariness. Why arrange claims according to money, they might ask, when blameworthiness is at least as compelling a way to rank them? Consider the following example:

Example 5: The plaintiff and the defendant are neighbors. The plaintiff files two claims. In claim A, she alleges that the defendant’s tree obstructs her sunlight, causing her a loss of \$200. In claim B, she alleges that the defendant slashed her tires, causing her a loss of \$100. Each claim has a 60% probability of being valid.

Assume that the outcomes indeed should be ranked according to the moral fault that they imply, not according to their monetary values. Table 5 details the ordering of outcomes – in its new form – as applied to Example 5:

Table 5.

OUTCOME NO.	1	2	3	4
LIABILITY	None	A	B	A and B
MORAL FAULT	None	Low	High	Highest
PROBABILITY	16%	24%	24%	36%

The median would now be outcome 3: the defendant is liable only for claim B, and the plaintiff should therefore be awarded \$100. This outcome, however, threatens to distort the plaintiff’s incentives – she may forgo claim B to avoid aggregation and guarantee herself compensation of \$200. Furthermore, it also violates the preponderance-of-the-evidence standard (since the plaintiff can prove by a 60% probability that her damages are either \$200 or \$300). As established in Part II, both of those drawbacks are avoided if the outcomes are ranked according to the monetary value of the underlying claims.

B. Impracticality

Can judges and juries determine precise probabilities for all outcomes, as the Tables used throughout this Essay require? Perhaps not. Such precision,

however, is not essential to the effective implementation of the doctrine. Estimating and understanding probabilities like 30% or 43% in a real case does seem like an implausible task, but judges and juries know what 50% means (the odds in any fair coin toss), and that knowledge is all that is required in order to find the median outcome.²⁴

Recall that the median is the “middle outcome,” in the sense that there is more than a 50% probability that the defendant is liable for the median amount or higher, and at least a 50% probability that the defendant is liable for the median amount or lower. Accordingly, judges and juries can determine the median outcome effectively with reference only to that 50% figure. In Example 1, a court might not be able to say with certainty that the probability that damages are \$100 or higher is precisely 64%, or that the probability that damages are \$100 or lower is exactly 60%. But a court could competently determine whether each of those probabilities is at least 50%.²⁵

Furthermore, when considering whether the median outcome rule is sufficiently practical, it should be measured in relative, rather than absolute, terms. The alternative weighted-average method, for instance, requires a much more complicated procedure. For this method, by definition, one needs to determine the exact probabilities of each possible event to calculate a remedy. The median outcome rule does not require such precision.

Alternative implementation methods can indeed be simpler to calculate and thus, to some degree, more practical. The smallest- and largest-remedy approaches, for example, might seem to require no probabilistic assessment at all. Yet recall that these are all methods to calculate an aggregated remedy once a court has already determined that some liability is appropriate. Estimating probabilities underlies the very idea of aggregation and is essential to a court’s basic determination that a defendant should be held liable. Thus, even if

24. An analytical description of the mental process that decisionmakers are presumed to undergo in attempting to comprehend probabilities supports this insight. See Gabrielle Gayer, *Perception of Probabilities in Situations of Risk: A Case Based Approach*, 68 GAMES & ECON. BEHAV. 130 (2010). Relying on past experiences with lotteries won and lost, Gayer argues that if memory is made up of binary lotteries only (each with only two possible results), then the only probability that is never distorted and that is correctly evaluated is 0.5. *Id.* For empirical evidence of this insight, see Frederick Mosteller & Philip Nogee, *An Experimental Measurement of Utility*, 59 J. POL. ECON. 371 (1951).

25. The decisionmaker would first contemplate whether the event “defendant is liable for at least \$100” is more probable than the complementary event, namely, “defendant is not liable at all.” Then the decisionmaker would consider whether the event “defendant is liable for no more than \$100” is more probable than its complementary event, namely, “defendant is liable for at least \$200.” If the answer in both cases is in the affirmative, then \$100 is the median outcome.

awarding the smallest or largest remedy is simple, a court cannot be in a position to order such a remedy without first performing significant probabilistic analysis. Even the simplest rules for calculating an aggregated remedy, then, might not significantly reduce the probabilistic work a court must perform overall.²⁶

Finally, recall that, even should some alternative method nevertheless be proved to be significantly more practical than the median outcome rule, and thus administratively cheaper, the alternative would not necessarily be preferable to the doctrine offered in this Essay. Any such alternative rule would inevitably violate the preponderance-of-the-evidence standard and might also distort the parties' incentives. Both of those costly flaws, from which the median outcome rule does not suffer, must also be taken into account.

CONCLUSION

Ariel Porat and Eric Posner have exposed systematic distortions in the law's treatment of cases that involve multiple claims, multiple plaintiffs, or both. Those distortions stem from the law's unresponsiveness to significant information that can be inferred from aggregation. However, an improper implementation of aggregation may yield outcomes that are inconclusive in terms of the compensation level, that violate the preponderance of the evidence standard, or that distort the incentives of both plaintiffs and defendants.

This Essay refines and complements the argument put forth by Porat and Posner by suggesting a practical method of implementation—the median

26. This Essay has used discrete probability distributions when explaining the median outcome rule. In other words, for each Example, it has identified a finite number of damages awards and then assigned them positive probabilities that sum to 1. Thus, in Example 1, there is a 16% chance that damages should be precisely \$300, a 24% chance for \$200, a 24% chance for \$100, and a 36% chance for \$0. This is not, however, the only way to conceive of the probabilities of potential damages awards in a case. We could employ a continuous, rather than discrete, probability distribution, where any real number between the lowest and highest possible awards—in Example 1, \$0 and \$300—is possible. Under the continuous approach, no particular damages award has a positive probability; the odds of any precise number must be 0, since there is an infinite range of such numbers. The continuous probability distribution would instead express probabilities of intervals—something like “the probability of damages being between \$50 and \$150 is 70%.” This continuous approach would arguably make a judge's or jury's application of the median outcome rule even more intuitive and practical. The decisionmaker would simply need to determine a damages award x such that the probability of damages between the lowest possible amount and x would be 50%, as would the probability of damages between x and the highest possible amount. Such an approach to the calculation of damages may be at work in cases where juries find for a plaintiff but do not award the full damages that the plaintiff seeks.

outcome rule—that completely avoids these pitfalls and can be used when aggregation in private law is otherwise desirable.

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