

*Yale Law School John M. Olin Center for Studies in
Law, Economics, and Public Policy Working Paper
Series*

*John M. Olin Center for Studies in Law,
Economics, and Public Policy Working Papers*

Yale Law School

Year 2001

A Critique of ‘Tangibility’ as the Basis
for Property Rules

Ian Ayres*

Paul Goldbart†

*Yale Law School

†University of Illinois at Urbana-Champaign, Department of Physics

This paper is posted at Yale Law School Legal Scholarship Repository.

<http://digitalcommons.law.yale.edu/lepp-papers/251>

A CRITIQUE OF “TANGIBILITY”

AS THE BASIS FOR PROPERTY RULES

by

IAN AYRES* AND PAUL M. GOLDBART**

Abstract. Kaplow and Shavell have recently claimed that property rules tend to protect tangible entitlements more efficiently than do liability rules. They argue that while liability rules tend to efficiently harness the defendant’s private information when courts are imperfectly informed as to litigants’ valuations of intangible entitlements, this harnessing effect does not apply to tangible entitlements for two reasons. First, they argue that the prospect of multiple takings (by others or even the original entitlement holder taking back the entitlement) makes it impossible to implement liability rules with regard to tangible entitlements. Second, they argue that liability rules cannot harness private information when the disputants’ valuations are correlated and that valuations of tangibles tend to be more correlated than valuations of intangibles.

In this essay, we reject both the multiple-takings and the correlated-value claims. Our thesis is that, while both present real problems of implementation, the authors’ own harnessing result can be extended to redeem the usefulness of liability rules even when values are correlated and even when there is the prospect of multiple takings. We will show that, even in the presence of these problems, enlightened courts can manipulate the damages that takers expect to pay so as to induce efficient takings.

The authors’ numeric examples purporting to show the dominance of property rules systematically understate the potential efficiency of liability rules. Their examples compare the more efficient property rules to liability rules that use inefficient damages and systematically delegate allocative authority to the less efficient litigant. If the more appropriate comparisons are made, in all of Kaplow and Shavell’s examples liability rules (which anticipate non-consensual takings) dominate property rules.

File: E:\Zip\goldbart\kap.com.sub.wpd

Word Count: 14,688

*William K. Townsend Professor, Yale Law School. ian.ayres@yale.edu.

**Professor, University of Illinois at Urbana-Champaign, Department of Physics.
goldbart@uiuc.edu.

Jennifer Brown and Fredrick Vars provided helpful comments.

TABLE OF CONTENTS

INTRODUCTION	1
I. DISTINGUISHING EMPIRICAL AND THEORETICAL ASPECTS OF THE TANGIBILITY THESIS	7
II. CRITIQUE OF THE CORRELATED-VALUE CLAIM	10
A. <i>The Optimal Damages</i>	18
B. <i>The Optimal Option Holder</i>	24
C. <i>The Lemons' Problem</i>	35
III. CRITIQUE OF THE MULTIPLE-TAKINGS CLAIM	39
A. <i>The Reciprocal Takings Problem</i>	40
B. <i>The Multiple-Takers Problem</i>	43
CONCLUSION	45

A CRITIQUE OF “TANGIBILITY” AS THE BASIS FOR PROPERTY RULES

INTRODUCTION

Scholars have often conceived of the core difference between property rules and liability rules as the difference between protecting by deterrence and protecting by compensation. Property rules protect entitlements by deterring non-consensual takings, while liability rules compensate entitlement holders if a non-consensual taking occurs.¹ Kaplow and Shavell, however, in a truly excellent article that repays close reading have reoriented the debate by showing how liability rules are an *allocative* device that economizes on the litigants’ private information when a court is imperfectly informed as to their valuation.² As Kaplow and Shavell succinctly put it: “[T]he virtue of the liability rule is that it allows the state to harness the information that the injurer naturally possesses about his prevention cost.”³ They show that setting damages equal to the court’s estimate of the entitlement holder’s valuation not only compensates the entitlement holder for any non-consensual takings that occur, but also induces value-enhancing takings. A potential defendant considering whether to take an entitlement protected by a liability rule will tend to take only if her benefits from taking are greater than her estimation of what damages will be. And since the latter is tied to the court’s estimate of the entitlement holder’s value, defendants will only tend to take the

¹Carol M. Rose, *The Shadow of the Cathedral*, 106 YALE L.J. 2175 (1997); Ian Ayres, *The 1998 Monsanto Lecture: Protecting Property with Puts*, 32 VAL. U. L. REV. 793 (1998); Ian Ayres & Paul M. Goldbart, *Optimal Delegation and Decoupling in the Design of Liability Rules* (working paper, 2001).

²Louis Kaplow & Steven Shavell, *Property Rules Versus Liability Rules: An Economic Analysis*, 109 HARV. L. REV. 713 (1996).

³Kaplow & Shavell, *supra* note 2, at 725.

entitlement when their value is greater than the entitlement holder’s value.⁴

This “harnessing” result clarifies and formalizes the pioneering work of Calabresi and Melamed.⁵ After Kaplow and Shavell, it is now possible to see that courts should set liability rule damages so that potential takers – given their private information about the value of taking – will only take when the taking is expected to enhance value.⁶ Liability rules seem to focus on the entitlement holder -- by having the courts set damages at their best estimate of the entitlement

⁴The authors provide the following numeric example:

If harm is \$1000 but the state does not know whether the prevention cost is \$800 or \$1200, the state may make one of two mistakes: giving the victim the right to be free from harm when in fact the prevention cost is \$1200 (so that it would be socially desirable for harm to occur), or giving the injurer the right to cause harm when the prevention cost is only \$800 (so that it would be desirable for the injurer to prevent harm). Inevitably, the state will make mistakes in assigning entitlements to parties when its information about the injurer's prevention cost is imperfect. Under the liability rule, however, the socially optimal outcome will always occur. Faced with damages of \$1000 for harm, the injurer will cause harm if and only if his prevention cost (which he knows) is \$1200; if his prevention cost is \$800, he will prevent rather than cause harm.

Kaplow & Shavell, *supra* note 2, at 725 (footnotes omitted)

⁵Guido Calabresi & Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972). The “harnessing” result might alternatively be thought of as an “internalization” result, because such damages cause the decision maker to internalize the expected costs as well as the benefits of her decision. We slightly prefer the term “harnessing” because of its implicit emphasis on the harnessing of the decision maker’s private information. If the private litigants do not have an information advantage over the courts, there is no need to delegate the allocative choice to the litigant (via potential taking) – the court could merely assign the entitlement to the higher valuer via a property rule. Kaplow & Shavell, *supra* note 2, at 724.

⁶In some ways, their harnessing result is a generalization of the idea of efficient breach in contract theory. David Friedman, *The Efficient Breach Fallacy*, 18 J. Legal Stud. 1, 5-7 (1989). Setting expectation damages equal to the court’s estimate of the promisee’s value of performance will tend to induce the promisor to breach only when breach is efficient (that is, when the promisor’s cost of performance is greater than the promisee’s benefit from performance).

holder’s harm from the taking.⁷ But after Kaplow and Shavell, it is now possible to think of liabilities rules as focusing on the potential taker -- having the secret ambition of giving the potential taker the incentive to take efficiently.

The harnessing result allows Kaplow and Shavell to overthrow one of the most basic tenets of law and economics scholarship – the idea (distilled from Calabresi and Melamed) that property rules are presumptively more efficient than liability rules when transaction costs are low.⁸ Kaplow and Shavell (following Ayres & Talley)⁹ showed that there is no reason to think that liability rules will produce lower efficiency than property rules in low transaction cost settings:

[We] cast doubt on the belief that property rules are best when transaction costs are low -- assertedly because the use of property rules will induce parties to bargain and reach desirable outcomes We find that this belief is often contradicted: when transaction costs are low, parties will tend to bargain under liability rules as well as under property rules and may reach

⁷From option perspective, both the plaintiff and the defendant under a Type-2 liability rule are really entitlement holders. The defendant has an entitlement to a valuable taking option, while the plaintiff owns the underlying asset subject to this option. See Rose, *supra* note 1, at 2183; Ayres, *supra* note 1, at 797; Ian Ayres & Eric Talley, *Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade*, 104 YALE L.J. 1027 (1995) (hereinafter Ayres & Talley I).

⁸Calabresi & Melamed, *supra* note 5, at 1106-10. For a more explicit characterization, see Robert Cooter & Thomas Ulen, *Law and Economics* 98-100 (2d ed. 1995). Numerous additional citations to the proposition can be found in Daphna Lewinsohn-Zamir, *The Choice Between Property Rules and Liability Rules Revisited: Critical Observations from Behavior Studies* (unpublished manuscript 2001).

⁹Ian Ayres and Eric Talley had previously provided a numeric example in which bargaining under liability rules produced greater efficiency than bargaining under property rules. Ayres & Talley I, *supra* note 7. Ayres and Talley showed that liability rules have an information-forcing effect in bargaining (not shared by property rules) that might cause disputants to bargain more efficiently. While the two authorial pairs agree that property rules need not dominate liability rules when transaction costs are low, they differ on the reason. See Louis Kaplow & Steven Shavell, *Do Liability Rules Facilitate Bargaining? A Reply to Ayres and Talley*, 105 YALE L.J. 221 (1995); Ian Ayres & Eric Talley, *Distinguishing Between Consensual and Nonconsensual Advantages of Liability Rules*, 105 YALE L.J. 235 (1995) (hereinafter Ayres & Talley II).

outcomes superior to those reached under property rules¹⁰

When transaction costs are nil, the Coase theorem preordains that liability and property rules will be equally efficient – and transaction cost advocates have never advanced a reason why property rules should produce more efficient bargaining when transaction costs increase from zero to merely low.¹¹ Indeed, Kaplow and Shavell’s harnessing results suggest that bargaining might tend to be more efficient under a liability rule because the litigants bargain in the shadow of more efficient threat points.¹²

To our minds, both the harnessing result and the authors’ critique of property rule dominance

¹⁰Kaplow & Shavell, *supra* note 2, at 718.

¹¹Ayres & Talley II, *supra* note 9, at 242. Kaplow and Shavell make the point thus: One [often finds] summary expression of the belief that use of a property rule to bar outright appropriation of things is desirable because it forces a person who wants something to bargain for it with its possessor. The belief derives from the idea that, through the requirement of bargaining, we can be reasonably confident that property will change hands when and only when the change is efficient. For example, bargaining can ensure that my car will be transferred to another person when and only when he values it more highly than I do. This argument, however, is not one that supports property rules over liability rules in any obvious way. If we believe that bargaining will result in the achievement of mutually beneficial transfers when they exist, that will be so under a liability rule as well as under a property rule. If Jack can take my car if he pays damages of \$10,000, but in fact I value the car more highly than he does, I could still bargain with Jack, paying him to refrain. (This is, of course, an application of the Coase Theorem.)

Kaplow & Shavell, *supra* note 2, at 721-22.

¹²Ayres & Talley referred to this as the “non-consensual advantage” of liability rules. Ayres & Talley II, *supra* note 9, at 241. The harnessing result gives liability rules a non-consensual advantage over property rules when bargaining is not feasible, and Kaplow and Shavell conjecture that such an advantage is likely to persist as transaction costs are reduced and bargaining becomes feasible. *Id.* It is far from clear, however, that more efficient threat points (i.e., the payoffs that will result if bargaining is unsuccessful) translate into more efficient bargains. Indeed, Ayres & Talley show that less efficient threat points (induced by expected litigation costs) can induce more efficient bargaining. *Id.* at 245.

in low transaction cost setting are unassailable. But Kaplow and Shavell go further. Their article also tries to replace the void left by their transaction cost critique. If low transaction costs don't explain the prevalence of property rules, what does? Their answer is that property rules tend to be the more efficient way to protect tangible entitlements (what they term “the taking of things”) while liability rules -- because of the harnessing result -- tend to be the more efficient way to protect intangible entitlements (what they term “harmful externalities”).

Their attempt to find a more solid foundation for property rules is admirable. Both property and liability rule protections have had such enduring and widespread (but not all encompassing) usage, that it is quite natural to look for an explanatory theory that doesn't prove too much. To hold that liability rules are systematically more efficient than property rules in all contexts (say, because of the harnessing result) would mean that an inefficient form of entitlement protection had been able not just to survive but to thrive. This strikes many (law and economics) scholars as presumptively implausible.

To support their thesis that property rules tend to dominate with regard to the protection of tangibles, the authors offer two core arguments. First, they argue that liability rules cannot harness private information when the disputants' valuations are correlated and that valuations of tangibles tend to be more correlated than valuations of intangible. Second, they argue that liability rules cannot feasibly be used to protect tangible entitlements because of the problem of multiple takings (by others or even the original entitlement holder taking back the entitlement). We will refer to these two arguments respectively as the “correlated-value” and the “multiple-takings” claim. Because the correlated-value and multiple-takings problems do not apply to intangible entitlements, the authors

argue that the harnessing result causes liability rules to be the more efficient way to protect intangibles. But because correlated-value and multiple-takings problems undermine liability rules’ ability to harness private information, they argue that property rules tend to be the more efficient way to protect tangible entitlements.

In this essay, we reject both the correlated-value and multiple-takings claims. Our thesis is that, while both present real problems of implementation, the authors’ own harnessing result can be extended to redeem the usefulness of liability rules even when values are correlated and even when there is the prospect of multiple takings. We will show that, even in the presence of these problems, enlightened courts can manipulate the damages that takers can expect to pay so as to induce efficient takings. The authors’ laudable desire to develop a theory that could broadly explain observed legal practice seems to have trumped their willingness to run with what to our minds is the more important insight – the ability of liability rules to harness a taker’s private information.

The authors’ numeric examples purporting to show the dominance of property rules systematically understate the potential efficiency of liability rules. Their examples compare the more efficient property rules to liability rules that use inefficient damages and systematically delegate allocative authority to the less efficient litigant. We will show that if the optimal liability rule is instead compared to the more efficient property rule, in all of the numeric examples constructed by Kaplow and Shavell themselves liability rules (which contemplate non-consensual takings) dominate.

This essay is divided into three sections. The first distinguishes the empirical and theoretical aspects of their tangibility thesis. The second critiques the correlated-value claim. The third

critiques the multiple-takings claim. Even though we ultimately reject tangibility as an adequate grounds for property rule protection, we believe that Kaplow and Shavell deserve credit for seeing even further into the cathedral than their predecessors.

I. DISTINGUISHING EMPIRICAL AND THEORETICAL ASPECTS OF THE TANGIBILITY THESIS

The authors’ claim that tangible entitlements tend to be most efficiently protected by property rules can be decomposed into empirical and theoretical elements. As a theoretical matter, they argue that when disputants’ valuations are correlated or when entitlements are potentially subject to multiple takings that property rule protections tend to be more efficient.¹³ As an empirical matter, they argue that tangible entitlements are likely to give rise to correlated values and multiple takings.¹⁴

Their empirical claim is supported by an appeal to archetypes. For them, the archetypal intangible is a nuisance entitlement, while the archetypal tangible is a chattel entitlement.¹⁵ They plausibly argue that the benefits from pollution are likely to be uncorrelated with harms to the recipient of pollution -- so that in nuisance disputes the valuations are likely to be uncorrelated. While in a dispute over some chattel (say, an automobile), the valuation of the potential taker is more likely to be positively correlated with the valuation of the initial owner. Hence, the archetypal tangible entitlement has correlated values, while the archetypal intangible does not.

Similarly, they argue that tangible chattel are more potentially subject to multiple-taking problems than intangible nuisance entitlements. Almost anyone might be a potential taker of an

¹³Kaplow & Shavell, *supra* note 2, at 720.

¹⁴*Id.* at 757.

¹⁵*Id.* at 760.

automobile (and once taken the original owner might decide to take back). But there are only a few neighboring landowners who could pollute a particular piece of land, and it is all but impossible for the pollutee to physically take back her initial entitlement (to be free from pollution).

Some scholars might be willing to dispute these empirical tendencies. And Kaplow and Shavell themselves provide some counterexamples.¹⁶ But it is important to note that these empirical claims are not essential. The authors might have repositioned their thesis to argue -- purely from theory -- that property rules tend to be more efficient when there are correlated-value or multiple-taking problems. They could have then left it to the reader to decide whether chattel (or particular types of chattel) have one or the other attribute.

Decomposing their theoretical and empirical contributions probably would have also clarified their thesis. For at present, the authors never say whether property rules will tend to dominate if only one of the two attributes is present. If, for example, an entitlement has the correlated-valuation but not the multiple-taking attribute, are liability or property rules more efficient? While Kaplow and Shavell do not explicitly answer this question, their arguments appear disjunctive. They seem to imply that if *either* correlated-valuation problems *or* multiple-taking problems exist, the beneficial harnessing effect of liability rules is rendered inoperative and property rules would dominate.

Inferring whether their theory is disjunctive is of more than passing interest, because in important parts of the cathedral only one feature exists. Contractual entitlements probably have correlated values but not the multiple-taking feature. Valuations of contractual entitlements to services will tend to be correlated (even though the cost of performance and the benefits of use may

¹⁶Id. at 772 (discussing the taking of a hotel’s ocean view as involving correlated values).

be independent) because the exchange value is likely to be correlated. The seller could sell the service (say, a rock concert performance) to another buyer and this should induce positive correlation in valuation. But if a seller breaches her promise of performance (thus taking the promisee’s contractual entitlement), it will be difficult for the promisee (or for a third party) to take back the entitlement.

The authors continue the Calabresian tradition of ignoring contractual entitlements -- possibly because neither the transaction cost nor the tangibility theory provides a very good explanation of why these entitlements are dominantly protected by liability rules. Calabresi and Melamed’s transaction cost theory held that property rules should dominate when transaction costs were low -- but with regard to the protection of contractual entitlements where the parties have already demonstrated an ability to enter into an initial transaction, the law protects entitlements with the liability rule of expectation damages instead of the property rule of specific performance.¹⁷ Similarly, Kaplow and Shavell’s correlated-value claim leads us to expect that many contractual entitlements would be protected by property rules, when they are not.

In this essay, we do not take on the empirical aspects of the tangibility thesis. We think the archetypal distinction between nuisance and chattel entitlements is illuminating, but we demur as to whether correlated valuation and multiple-taking potentials are central tendencies. Our

¹⁷The incompatibility of transaction cost theory with contract practice have led some scholars to call for a reform of practice – expanding the use of property rule protection of contractual entitlements. See Anthony T. Kronman, *Specific Performance*, 45 U. Chi. L. Rev. 351, 352 (1978); Thomas S. Ulen, *The efficiency of Specific Performance: Toward a Unified Theory of Contract Remedies*, 83 Mich. L. Rev. 341, 375-76 (1984); Alan Schwartz, *The Case for Specific Performance*, 89 Yale L. J. 271 (1979).

agnosticism as to whether chattel give rise to correlated valuation grows out of agnosticism about the nature of court ignorance. For correlated valuations to undermine the harnessing effect of liability rules, it must be that the part of litigants’ value *not visible to the courts* be correlated. While the authors quite plausibly argue that the total chattel valuations of disputants are often positively correlated, it is less clear that the portion of value unobservable to courts is correlated. A major source of correlated valuation is the potential exchange value of the entitlement. What tends to be correlated in value is that component for which there is a market value. But market values may tend to be relatively observable by judges. It is the litigants’ idiosyncratic, non-market values that are likely to be less observable by courts and less correlated. This is not to say that there cannot be correlated values that are privately known, only that the strength of the tendency may not be as great as Kaplow and Shavell suggest in their examples.¹⁸

But even if the empirical distinctions that Kaplow and Shavell posit are true, we will show in this essay that the authors’ own harnessing principle can be extended and generalized to cope with the very real problems of correlated valuations and multiple takings. That is the task of the next two sections.

II. CRITIQUE OF THE CORRELATED-VALUE CLAIM

One of the most innovative and important contributions of Kaplow and Shavell’s article

¹⁸See *infra* at 13 (discussing Kaplow and Shavell’s numeric examples in which correlated component of value is assumed to vary over a range ten times larger than that of the idiosyncratic component of value).

concerns their analysis of correlated valuations.¹⁹ If the valuation of the potential taker and the entitlement holder are positively correlated, then it becomes more difficult to use liability rules to harness the potential taker’s private information (about her own value). Simply setting damages equal to the plaintiff’s average valuation can easily lead to inefficient overtaking by defendants. If the defendant’s and plaintiff’s valuations are positively correlated, a high realized defendant valuation also implies a higher-than-average realized plaintiff valuation. A defendant might have a valuation higher than the average plaintiff value (and thus want to take) even though, given the correlated valuations, the defendant knows that it’s own valuation is still likely to be lower than the plaintiff’s expected valuation.

Kaplow and Shavell illustrate this correlated-value problem with a series of examples in which the litigants’ overall valuation can be decomposed into “common value” and “idiosyncratic value” components.²⁰ For example, in one of their examples they assume that (i) the litigants’ common value component is uniformly distributed between 90 and 110; (ii) the plaintiff’s

¹⁹We believe that this contribution has not received much scholarly attention as it should in the five years since the article was published in part. Their introduction only obliquely mentions the problem of correlated values:

If the problems of reciprocal takings . . . are put to the side, it might seem that the liability rule with damages equal to the average value of a thing taken would be attractive, by the logic we offer in favor of liability rules in the case of harmful externalities. But that logic, it turns out, does not extend to the case at hand, for reasons that are subtle and best deferred. Kaplow and Shavell, *supra* note 2, at 722.

²⁰Kaplow & Shavell, *supra* note 2, at 759-60 (“First, suppose that things have a significant common value, that is, a component of value that is the same for both the owner and any taker. . . . Second, assume that things also have idiosyncratic value to individuals. Idiosyncratic value derives from characteristics of a thing that different individuals evaluate differently, such as the design of a home.”).

idiosyncratic value component is uniformly and independently distributed between 0 and 10; and, (iii) the defendant’s idiosyncratic value component is uniformly and independently distributed between 0 and 8.²¹ These assumptions mean that a litigant’s individual valuation will be the sum of the realized common value and his or her realized idiosyncratic value.²² The litigants’ valuations are correlated here because there is a common variable component to each litigant’s overall valuation.

Kaplow and Shavell show that a traditional liability rule -- which would force a taking defendant to pay damages set equal to the plaintiff’s mean valuation of 105 (100 mean common value plus 5 mean idiosyncratic plaintiff value) -- will be less efficient than giving the plaintiff the entitlement protected by a property rule. The expected joint payoff under a liability rule with 105 damages is 104.82, while the joint payoff under a property rule is 105.

When the litigants’ valuations are positively correlated, it is difficult for the court’s allocative price to distinguish between unexpectedly high realizations of the common value component versus unexpectedly high realizations of the idiosyncratic value component. In the foregoing example, a liability rule with 105 damages induces the defendant to take too often. For example, if the common value component should turn out to be 108, a defendant would always take -- even if its idiosyncratic value were as low as 0. These takings, on average, would be inefficient because on average the plaintiff’s idiosyncratic value is higher than the defendant’s (5 vs. 4). A high realization of the

²¹Kaplow & Shavell, *supra* note 2, at 789.

²²For example, if the common value of both parties turns out to be 103 and if the idiosyncratic value of the plaintiff turns out to be 8, the plaintiff’s total realized value would be 111.

common value tells us nothing about whether the defendant’s idiosyncratic value is greater than the plaintiff’s – and the latter comparison is what drives allocative efficiency.

A court would like to induce defendants to take only when they have a high idiosyncratic value, but in structuring a liability rule courts can only announce a damage amount which represents a combination of the common and idiosyncratic valuations. A defendant who chooses to take (when its total value is greater than expected damages) may be doing so either (i) because it has high idiosyncratic damages or (ii) because both plaintiff and defendant have a high common value. The former takings will on average be efficient (for the same harnessing rationale discussed above), but the latter takings (driven by high common values) will tend to be inefficient.²³

Kaplow and Shavell attempt to show how correlated valuation causes property rules to tend to dominate liability with a series of five examples which they analyze in their text and appendix. The first three rows of Table 1 describe the assumptions underlying these examples.²⁴ Example 2 was the basis of our earlier discussion:²⁵ the common value component of both litigants is uniformly distributed between 90 and 110; the plaintiff’s idiosyncratic value is uniformly distributed between 0 and 10; and the defendant’s idiosyncratic value varies between 0 and 8.

The examples all assume – what the authors take to be generally true – that possessors tend

²³Kaplow & Shavell, *supra* note 2, at 760.

²⁴Examples 1 through 4 can be found in their appendix, *id.* at 789. Example 5 can be found in their text, *id.* at 761. The textual example asks the reader to assume “most of these idiosyncratic values are in the neighborhood of \$25” which suggests a normal distribution. *Id.* But for the sake both of simplicity and comparability with the other examples, we assume that all distributions in Table 1 are uniform.

²⁵See *supra* at 11.

to have higher expected valuations than nonpossessors.²⁶ The authors at times intimate that this is a core assumption, but it merely determines which of the two potential property rules is the more efficient and not the relative superiority of property vs. liability protection.

The examples also assume that the court’s uncertainty as to common value (seen here by the width of the distribution) is greater than the court’s uncertainty as to the defendant’s idiosyncratic value. As mentioned above, this latter assumption is empirically contestable.²⁷ But we will show that (contrary to Kaplow and Shavell) liability rules can still be useful when a court’s imperfect information mainly stems from its difficulty in estimating the litigants’ common value.

²⁶See Kaplow & Shavell, *supra* note 2, at 775.

²⁷See *supra* at 10.

Table 1: Kaplow and Shavell’s Numeric Examples					
	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5
Common Value Distribution	[90, 110]	[90, 110]	[95, 105]	[95, 105]	[0, 200]
Plaintiff’s Idiosyncratic Value Distribution	[0, 10]	[0, 10]	[0, 10]	[0, 10]	[0,50]
Defendant’s Idiosyncratic Value Distribution	[0, 5]	[0, 8]	[0, 6]	[0, 8]	[0,10]
Expected Joint Payoff Under “Plaintiff” Property Rule	105	105	105	105	125
Assumed (Defendant Choice) Liability Rule Damages	105	105	105	105	125
Expected Joint Payoff Under Assumed (Defendant Choice) Liability Rule	104.147	104.816	104.697	105.129	117.041
More Efficient Rule	Property	Property	Property	Liability	Property

The remaining rows of Table 1 replicate the authors’ efficiency analysis. The efficiency of a particular regime is directly captured by measuring the expected joint payoffs to the litigants. Kaplow and Shavell ask: Which type of regime will produce the highest expected joint payoffs in the absence of bargaining? If a regime is more efficient when bargaining is not possible, they conjecture that it is likely to remain more efficient as transaction costs fall.²⁸

Under a plaintiff property rule, the expected joint payoffs in the absence of bargaining will equal the plaintiff’s mean value (mean common value plus mean plaintiff idiosyncratic value). The defendant gets zip. Continuing our discussion of Example 2, we see in Table 1 that under the

²⁸See supra note 12.

plaintiff property rule that the expected joint payoff is 105 (the mean common value of 100 plus the mean plaintiff idiosyncratic value of 5).

The authors compare this payoff to the payoff from what we will term a traditional liability rule²⁹ with traditional damages. They ask what would be the expected joint payoff if the defendant had the option to take the entitlement non-consensually and pay the plaintiff her expected value. Since Kaplow and Shavell *assume damages equal to the mean plaintiff's value*, the damages row is identical to the property rule expected payoff row in Table 1 (again, 105 for Ex. 2). As discussed above, the problem with correlated valuations is that they can induce defendants to over take -- taking even when their value is lower than what given correlated values they expect the plaintiffs value to be. In Example 2, defendant takings create expected losses from inefficient takings that are 31.3% greater than the expected gains from efficient takings.

Indeed, in four of the five examples, property rules are claimed to be more efficient. Only in Example 4, where the variation in common value becomes relatively small compared to the variation in the defendants' idiosyncratic value does the liability rule become more efficient. But this is consistent with the authors' theory (which we will show to be false)³⁰ that as the variation in common value becomes small, the litigants' valuations become less correlated and the harnessing result once again militates toward the superiority of liability rules. Kaplow and Shavell use these examples to argue that the more correlated the valuations the more likely property rules are to be

²⁹Under the Calabresi and Melamed schema, giving the defendant the option to take and pay represents a “Rule 2” implementation. Calabresi & Melamed, *supra* note 5, at 1108. See also Ayres, *supra* note 1, at 797.

³⁰See *infra* at 29.

efficient.

The authors’ finding that it is more difficult to use liability rules to harness private information when the litigants’ valuations are correlated is an important result which we wish to praise.³¹ But while Kaplow and Shavell are correct that correlated valuations make it more difficult to harness private valuations, they are wrong to conclude that property rules dominate liability rules when valuations are positively correlated.

Their examples systematically overstate the advantages of property rules by comparing the more efficient property rule to a liability rule that has non-optimal damages and the less efficient chooser. Just as there are two possible property rules (giving the entitlement to the plaintiff or the defendant), Calabresi and Melamed famously showed that there are two possible liability rules – the traditional Type 2 rule (which gives the defendant the right to pollute if it pays damages) as well as Type 4 rule (which gives the plaintiff the right to stop pollution if it pays damages).³² In all of Kaplow and Shavell’s examples, it turns out that Type 4 is the more efficient liability rule (for reasons that we will soon make clear). If we compare the more efficient property rule (plaintiff ownership), to the more efficient liability rule (Type 4) with optimal damages, it turns out that

³¹It has long been recognized that the optimal mechanism for auctions or bargaining will turn on whether or not the bidders’/negotiators’ values are independent or not. See Peter Cramton & Alan Schwartz, *Using Auction Theory to Inform Takeover Regulation*, 7 J. L. Econ. & Org., 27 (1991); R. Preston McAfee & John McMillan, *Auctions and Biddings*, 25 J. Econ. Lit. 699, 722 (1987).

³²There are a wide variety of rules that are allocatively identical to the traditional Type 4 rule. Ayres & Goldbart, *supra* note 1, at 27. For example, giving the plaintiff the entitlement plus the (put) option to sell it for \$X should produce the same allocation as giving the plaintiff the (call) option to buy the entitlement for \$X. *Id.*

liability rules dominate property rules in Kaplow and Shavell’s own examples – even though valuations are correlated.

A. *The Optimal Damages*

Let us begin by investigating how optimal damages should be calculated in the presence of correlated values. It turns that Kaplow and Shavell’s own harnessing result can be extended to shed light on this issue. The core insight of the authors is that damages should be set so that a potential taker will only take when *given her private information about her own value* the taking is expected to be value enhancing. When the litigants’ valuations are uncorrelated, setting (Type 2) damages equal to the plaintiff’s expected value accomplishes this. But when damages are correlated, setting damages at the plaintiff’s expected value systematically induces too much taking because a defendant knowing it has a higher than average value should also expect (as in the earlier example) that the plaintiff has a higher than average value.

This positive correlation between the defendant’s value and what the defendant expects the plaintiff value on average to be is depicted in Figure 1 for the distribution assumed in Example 2. Look first at the most extreme possible defendant valuations. If the defendant knows her value to be 90, then she can infer that the plaintiff’s expected value is 95.³³ And if the defendant knows her

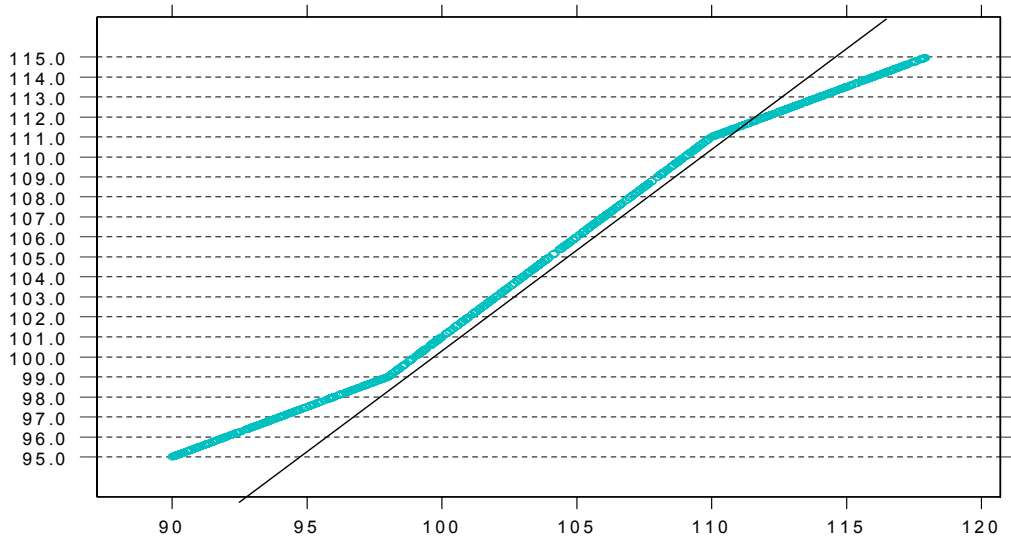


Figure 1: Plaintiff’s expected value conditional on Defendant’s realized value

³³If a defendant’s total valuation is 90, she can infer (under the Example 2 distributions) that her idiosyncratic value must be 0 and that the common value must be 90. If the common value is 90, then the plaintiff’s expected total value is 90 plus her mean idiosyncratic value of 5.

value to be 118, than she can infer that the plaintiff’s expected value is 115.³⁴ Figure 1 shows the plaintiff’s expected valuation for any given level of defendant value.

The figure illustrates Kaplow and Shavell’s over taking result. If liability rule damages are naively set equal to the plaintiff’s unconditional mean of 105, then defendants with valuations just infinitesimally above 105 will be induced to take the entitlement and pay damages. But the figure shows that when the defendant’s value is 105, the plaintiff’s expected value is 106. Thus, setting damages at the unconditional mean causes some defendants to take inefficiently -- even though they know (because of correlated values) that the plaintiff has a higher expected value.

But while Figure 1 shows a positive correlation between a defendant’s value and the plaintiff’s expected value, we can see that the plaintiff’s expected value grows more slowly. Comparing the endpoints, for example, we see that as the defendant’s value grows 28 (from 90 to 118), the plaintiff’s conditional mean grows only 20 (from 95 to 115). As long as the correlation in the litigants’ valuations is not perfect, a given increase in the defendant’s known value will translate into a smaller increase in the plaintiff’s conditional mean value. The relative flatness of the curve is important because it implies that there will often exist a point at which the plaintiff’s conditional mean value will equal the defendant’s value. This cross over point (or what economists sometimes call a “fixed point”) is shown in Figure 1 as the intersection of the conditional mean curve with the 45-degree line. For the distributions assumed in Example 2, it turns out that this fixed point occurs at 112.

³⁴If a defendant’s total valuation is 118, she can infer that her idiosyncratic value must be 8 and that the common value must be 110. If the common value is 110, then the plaintiff’s expected total value is 110 plus her mean idiosyncratic value of 5.

It turns out that setting damages at this fixed point is optimal. In example 2, if damages are set at 112, then defendants with valuations just infinitesimally above 112 will be induced to take the entitlement. But Figure 1 shows that all such takings can be expected on average to increase value. All defendants with valuations greater than 112 will be taking from plaintiffs who they can expect to have a lower value.

The figure further clarifies the difference between compensation and efficient allocation as the motive force behind liability rules. Damages of 112 will induce efficient takings by defendants, but some defendants will know that these damages will systematically undercompensate the plaintiffs: the plaintiff’s expected valuation conditional on the defendant’s value being greater than 112 will also be greater than 112 (just not as much greater).³⁵

The fixed-point result is just a generalization of Kaplow and Shavell’s own harnessing theory. When the litigants’ valuations are correlated, the optimal liability rule damages are still set equal to the plaintiff’s mean value -- but because this mean value is now itself a function of the defendant’s value, it is a conditional mean instead of an unconditional mean. Optimal damages should equal the plaintiff’s mean conditional on the defendant’s value also equaling the damage amount. Because the plaintiff’s mean value is now a function of defendant’s value, optimal damages will find the fixed point at which defendant’s value equals the plaintiff’s conditional mean value.³⁶

³⁵In a separate article, we show that it is possible for courts to construct allocatively identical versions of the traditional Type 2 which continuously vary how the gains from taking are divided between the litigants – thus allowing the court to decouple its distributive and allocation concerns. Ayres & Goldbart, *supra* note 1, at 10.

³⁶More formally if we denote the idiosyncratic plaintiff, idiosyncratic defendant and common components of value by Π , Δ , and C , respectively and denote the distribution of each component as

The intuitions behind Kaplow and Shavell’s harnessing result also generalize. When the litigants’ valuations are correlated, the court should select a damage amount such that if the defendant’s value were to equal this amount, the damages would, on average, equal the plaintiff’s value. Kaplow and Shavell are correct that the unconditional mean does not accomplish this, but they overlooked how setting damages equal to plaintiffs’ conditional mean could resurrect their harnessing result.³⁷

$f_{\Pi}(\Pi)$, $f_{\Delta}(\Delta)$, and $f_C(C)$ respectively, then optimal damages, D , are those that solve the following equation:

$$E[C + \Pi | C + \Delta = D] = D.$$

But because the expectation of a sum can be reexpressed as the sum of individual expected values, this can be reexpressed as:

$$E[C | C + \Delta = D] + E[\Pi | C + \Delta = D] = D.$$

Because the plaintiff’s idiosyncratic value is independent of both the common value and the defendant’s idiosyncratic value, this expression simplifies to:

$$E[C | C + \Delta = D] + E[\Pi] = D.$$

³⁷The authors, in a footnote and in the appendix, did consider the possibility of higher damages. But they did not derive the criteria for setting optimal damages:

[W]e should consider briefly whether a liability rule with damages different from average value might perform better than the liability rule with damages equal to average value. If damages exceed average value -- say, damages equal the highest possible common value plus the mean idiosyncratic value to owners -- those few takings that would occur would constitute efficient transfers, on average. . . . We mention, however, that the range of possible common values can be quite large. (Just what is the highest possible common value of having a laptop computer with which to take notes at a conference?)

Kaplow & Shavell, *supra* note 2, at 762 n.157. See also *id.* at 790:

The above analysis assumes that damages equal the average common value, 100, plus the average owners’ idiosyncratic value, 5, for a total of 105. Higher damages clearly are optimal. In the third example, for instance, if damages were 110, takings would be rare: only takers with idiosyncratic values above 5 would take (for the highest possible common value is 105 and damages are 110) and they would take infrequently (a necessary condition is that the common value exceed 104). Such takings would, on average, be desirable, because the taker’s value would, on average, exceed the owner’s value. (See our discussion in note 157.) We would, however, interpret such a rule as more like a property rule than a liability rule: even though damages are not infinite, they are high enough to deter virtually all takings.

Table 2 re-analyzes the five examples from Table 1 using the optimal damages. Instead of setting damages equal to the plaintiff’s unconditional mean, it sets damages equal to the conditional mean at the crossover point. For example, the table reports optimal damages in Example 2 of 112 as shown above in Figure 1.

The table also reports the expected joint payoffs under a liability rule with optimal damages. In contrast to Table 1’s comparison using naive (unconditional) damages – where property rule protection happens to be superior in four out of the five examples, Table 2 shows that liability rules with optimal (conditional, fixed-point) damages are more efficient in three of the five cases. For Example 2, the optimal damages of 112 give rise to expected joint payoffs of 105.113 instead of the 105 expected damages produced under a liability rule.

Neither of these discussions focus on optimal damages. The first passage mentions setting damages at the highest possible common value, but our discussion of Example 2 shows that such a standard is still lower than optimal fixed-point damages (110 vs 112). The second passage, in contrast, considers damages that are inefficiently high. The authors analyze damages of 110 damages for Example 3 when optimal fixed-point damages are only 109 (see *infra* Table 2). These examples suggest that the authors understood that elevated damages could increase efficiency, but had not derived the fixed point result for estimating the exact amount that would harness information. Counter to their suggestion, it is not necessary that a common value have an upper support in order for the court to calculate the fixed-point conditional mean. Finally, the authors’ assertion that it is appropriate to interpret higher damages as property rules because they “deter virtually all takings” conflates deterrence-based protections such as injunctions with harnessing protections, which aim to induce value-enhancing transfers.

Table 2: Kaplow and Shavell’s Examples With Optimal Damages					
	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5
Expected Joint Payoff Under “Plaintiff” Property Rule	105	105	105	105	125
Assumed (Defendant Choice) Liability Rule Damages	105	105	105	105	125
Expected Joint Payoff Under Assumed (Defendant Choice) Liability Rule	104.147	104.816	104.697	105.129	117.041
Optimal (Defendant Choice) Liability Rule Damages	115	112	109	107	210
Expected Joint Payoff Under Optimal (Defendant Choice) Liability Rule	105	105.113	105.011	105.225	125
More Efficient Rule	Property	Liability	Liability	Liability	Property

B. The Optimal Option Holder

By itself, the superiority of liability rules in a slight majority of these five examples tells us very little. Kaplow and Shavell’s examples certainly aren’t adequately structured to prove that property rules tend to dominate, but given the arbitrariness of the specific numbers assumed we would – without more – have to be agnostic about a general tendency.

But as it turns out, there is a second way that Kaplow and Shavell’s original comparison overstated the dominance of property rules. *They choose to compare the more efficient property rule to the less efficient liability rule.* In all of these examples it is more efficient to give the initial entitlement to the defendant and give the plaintiff the right to take and pay damages. This is the

famous Type 4 rule of Calabresi and Melamed that was judicially implemented in *Del Webb*.³⁸

It is straightforward to see that the more efficient property rule is to give the entitlement to the litigant with the higher expected value (in these examples always the plaintiff). In the absence of bargaining, this straightforwardly maximizes the parties’ expected joint payoff. Kaplow and Shavell made the facially plausible assumption that the more efficient liability rule would give the initial entitlement to the litigant with the higher value (and to give the lower-valuing litigant only the taking option).

But this assumption turns out to be false -- and the reason can quickly be seen once we appreciate that liability rules confer upon potential takers the *option* to take or not to take. From an option perspective, liability rules can be seen as dividing the litigants’ claims to the entitlement. One litigant receives a call option -- the option to buy -- while the other receives the entitlement subject to the call.³⁹ Appreciating this option interpretation directly leads to seeing that Type 4 dominates Type 2. A fundamental result of option theory is that options are more valuable the more volatile

³⁸*Spur Indus., Inc. v. Del E. Webb Dev. Co.*, 494 P.2d 700, 708 (Ariz. 1972) (Cameron, V.C.J). The court’s unconditional order seems to differ from the previous definition of a Type 4 rule, which gives the Resident the choice of whether (a) to pay to stop further pollution or (b) not to pay and to allow the Polluter to continue polluting. To harmonize the case with the definition, it is necessary to speculate about what would have happened if Del Webb had petitioned the court to void its order enjoining the pollution as well as its order that Del Webb indemnify Spur. If we believe that the court would have in effect allowed Del Webb to withdraw its initial complaint, it would have in effect been giving Del Webb the Type 4 choice—that is, the choice of paying to stop pollution or not paying and allowing the pollution to continue. Alternatively, at a minimum, future developers will realize that suing in this jurisdiction may be choosing to pay for an injunction.

³⁹See Ayres & Talley I, *supra* note 7, at 1048; Rose, *supra* note 1, at 2183; Ayres & Goldbart, *supra* note 1, at 18.

the underlying asset.⁴⁰ As applied to liability rules, this means that courts should tend to give the option to the litigant with the more variable valuation distribution.⁴¹ From Table 1, we can see that in all of the authors’ examples the plaintiff’s valuations are not only systematically higher, but systematically more volatile. From an option perspective, this suggests that the plaintiff is the more efficient taker – so that Type 4 is likely to be more efficient than Type 2.

Table 3 shows this in fact to be the case for all five examples. It reports the expected joint profits under a Type 4 regime using optimal (conditional, fixed-point) damages. Comparing Tables 2 and 3, it is easy to see that Type 4 dominates. The expected joint profits under Type 4 are systematically larger than the expected joint profits under Type 2. In Example 2, Type 2 (with optimal damages) produced expected joint payoffs of 105.113, while Type 4 is more efficient -- producing the higher expected joint payoff of 105.213.

The greater efficiency of Type 4 combined with optimal damages completely reverses Kaplow and Shavell’s claim that property rules will tend to be more efficient than liability rules when valuations are correlated. In all five of their examples, the optimal liability rule turns out to be more efficient than the best possible property rule.

⁴⁰See RICHARD A. BREALEY & STEWART C. MYERS, PRINCIPLES OF CORPORATE FINANCE 557 (5th ed. 1996)

⁴¹This proposition is formally shown in Ayres & Goldbart, *supra* note 1, at 28.

Table 3: Kaplow and Shavell’s Examples With Optimal Damages and Plaintiff Choice (Type 4)					
	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5
Expected Joint Payoff Under “Plaintiff” Property Rule	105	105	105	105	125
Assumed (Defendant Choice) Liability Rule Damages	105	105	105	105	125
Expected Joint Payoff Under Assumed (Defendant Choice) Liability Rule	104.147	104.816	104.697	105.129	117.041
Optimal (Plaintiff Choice) Liability Rule Damages	95	98	101	103	10
Expected Joint Payoff Under Optimal (Plaintiff Choice) Liability Rule	105.052	105.213	105.180	105.427	125.008
More Efficient Rule	Liability	Liability	Liability	Liability	Liability

These five examples themselves don’t prove a tendency but we can go still further. It turns out that as long as the option holder’s idiosyncratic value distribution can take on values both above and below the other litigant’s idiosyncratic mean that the liability rule will be superior.⁴² Sufficient variation in the option holder’s idiosyncratic values (relative to the other litigant’s idiosyncratic mean) implies that the option has both private and social value – sometimes it will be efficient to exercise the option (and transfer the entitlement) and sometimes it will be efficient for the option

⁴²More formally, as long as the non-chooser’s unconditional idiosyncratic mean lies with in the support of the chooser’s idiosyncratic value then the liability rule will dominate either possible property rule. In contrast, Kaplow and Shavell assert: “A sufficient condition for superiority of the property rule is that the support of the [defendant’s idiosyncratic distribution] lies below the [plaintiff’s idiosyncratic mean].” Kaplow & Shavell, *supra* note 2, at 788. Table 3 shows, however, that this assertion is only true if one restricts attention to Type 2 implementations.

holder not to exercise.

This sufficient condition for liability rule dominance also explains why examples 1 and 5 switch from having property to liability rule dominance as we switched from Type 2 to Type 4 implementations. In Example 1, the plaintiff’s and defendant’s idiosyncratic valuation varies between 0 and 10 and between 0 and 5 respectively. Under Type 2 when the defendant is the option holder, the defendant’s possible idiosyncratic values [0 to 5] do not vary above and below the plaintiff’s mean idiosyncratic valuation of 5. Giving the defendant an option to take in this example has no social value, because there are never realizations of defendant’s idiosyncratic value where we would want the defendant to take.

Kaplow and Shavell have provided an example where a property rule dominates a Type 2 implementation, but it should now be clear that the superiority of the property rule has *nothing* to do with the correlated valuation. Even if there were no correlated value (which could easily be accomplished by eliminating the variation in the common value distribution) the property rule would dominate because the Type 2 option would have no social value.⁴³

But Example 1 also shows that the failure of the sufficiency condition with regard to a Type 2 implementation does not imply that the condition will fail with regard to a Type 4 implementation. Under Type 4, the plaintiff is the option holder. In Example 1, the plaintiff’s idiosyncratic mean varies between 0 and 10 and the defendant’s idiosyncratic mean is 2.5 – so the plaintiff call option

⁴³When the option holder’s idiosyncratic distribution does not overlap with the non-option holder’s mean idiosyncratic value, there will not be an interior fixed-point damage amount – so that the optimal damages will be set at an extreme value under which the defendant will never take (or always take). This can be seen in Table 2 by the Example 1 liability damages of 115 which replicate a property rule outcome by deterring all defendant takings.

will have both private and social value.⁴⁴ Some realizations of the plaintiff’s idiosyncratic value will make a taking efficient and other realizations will make a taking inefficient. It is in just these circumstances that a liability rule will dominate property rule.

Note that our sufficiency condition merely compares the litigants’ idiosyncratic distributions. It is completely independent of the common value distribution. This is important because it implies that the superiority of liability rules to property rules does not turn on whether the variation in the litigants’ values is more importantly influenced by variation in common or idiosyncratic values. Regardless of how much (or how little) the common value varies, liability rules will dominate if the sufficiency condition holds. This finding directly contradicts Kaplow and Shavell’s assertion that property rules will dominate as long as the variation in the common value is large relative to the variation in the litigants’ idiosyncratic value.⁴⁵ That conclusion was an artefact of their comparisons of systematically inefficient liability rules to the most efficient property rules.

When the more appropriate horse race is run, it turns out that liability rules can dominate even when the idiosyncratic valuations are very small compared to common value variation. In Example 5, the common value variation (0 to 200) is four times the plaintiff’s idiosyncratic variation (0 to 50) and twenty times the defendant’s idiosyncratic variation (0 to 10), yet still a liability rule

⁴⁴A similar analysis shows why, for Example 5, a property rule dominated a Type 2 implementation but not a Type 4 implementation. In Example 5, the plaintiff’s and defendant’s idiosyncratic value distribution varied from 0 to 50 and from 0 to 10 respectively. Under Type 2, the defendant option-holder’s distribution lies strictly below the plaintiff’s mean value of 25. But under Type 4, the plaintiff option-holder’s distribution lies both above and below the defendant’s mean value of 5.

⁴⁵See *supra* at 16.

can produce slightly higher expected payoffs (125.008 vs. 125 as shown in Table 3).

Put simply, if a liability rule dominates in the absence of any common value variation, it will continue to dominate even if the common value variation becomes arbitrarily large. To be sure the degree of dominance will narrow – as the damages move toward a property rule level and the difference between the expected property and liability rule joint payoffs declines. But the mere existence of correlated valuation does not mean that harnessing private information becomes theoretically untenable. Indeed, the question of whether the best liability rule is more efficient than the best property rule is independent of whether the litigants’ valuations are correlated.

Kaplow and Shavell might counter that liability rules may be more efficient – but only to an insignificant extent. The optimal liability rule increases the expected joint payoffs of the litigants above those generated by a property rule but only by a small amount. Table 4 shows in Example 2 that the optimal liability rule expected joint payoff is only slightly higher than the expected joint payoff under a “Plaintiff” property rule (105.213 v. 105).

Table 4: Assessing the Movement Toward First-Best Allocative Efficiency					
	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5
A. Expected Joint Payoff Under “Plaintiff” Property Rule	105	105	105	105	125
B. Expected Joint Payoff Under Optimal (Plaintiff Choice) Liability Rule	105.052	105.213	105.180	105.427	125.008
C. First-Best (Perfect Information) Joint Payoff	105.417	106.066	105.600	106.067	125.333
D. Improvement in Allocative Efficiency As Percentage of Property Rule Shortfall from First Best (B-A)/(C-A)	12.5%	19.5%	30%	40%	2.4%

But the failure to produce substantial increases in efficiency is simply a byproduct of there being very little potential gains of trade to be had in their examples. Table 4 reports the maximum expected gains of trade that might be had if the court were perfectly informed about the litigants’ private valuation and could thus assign with certainty the entitlement to the higher valuer. We can see that the “first-best/perfect information” expected payoff is only slightly higher than the plaintiff’s mean valuation – implying that in these examples there are very little potential gains from trade to begin with. If we compare the enhanced efficiency of liability rules relative to this first-best upper limit, we see that liability rules capture a sizable proportion of the potential gains from efficient allocation (30% and 40% of the potential gains in Examples 3 and 4). If we alter the examples to allow for more substantial gains from trade, we find that optimal liability rules produce more

substantial increments (over property rules) in the expected joint payoff.⁴⁶

While we have shown that Type 4 liability rules are more efficient than property rules in Kaplow and Shavell’s own examples, the authors might respond that pure Type 4 rules will sometimes be difficult to implement.⁴⁷ A plaintiff might only gain the option to take an entitlement after the defendant has taken some triggering action (such as polluting). Sometimes the closest the law can come to a Type 4 rule is to give the plaintiff a *take back option* in the second-stage of two-stage game. Under such a regime, the defendant would first decide whether the benefits of initially taking the plaintiff’s entitlement are greater than the cost of the expected court award and the plaintiff would then decide whether the costs of losing the entitlement were worse than the benefit of expected damages. Either party could veto the transfer: the defendant by not initially polluting and the plaintiff by exercising its take back option.

In a separate article, we have extensively analyzed such “joint veto” options and shown that

⁴⁶For example, if both the common-value and the plaintiff-idiosyncratic components are distributed uniformly between 0 and 100, while the defendant-idiosyncratic component is distributed uniformly between 40 and 60, the expected joint payoff under a property rule is 100 while the expected joint payoff under the optimal (plaintiff choice) liability rule is 108.33 – which represents a capturing of 65.7% the potential gains of trade (112.67).

More generally, the incremental and percentage improvement in efficiency produced by the optimal liability rule (relative to the optimal property rule) will increase as either the mean or the variance of the common value component decreases (relative to the mean or variance of the option holder’s idiosyncratic value component). As discussed above, *supra* at 10, there is no reason to believe that the common value component will have from the court’s perspective a relatively large variance (given the tendency of common values to be dominantly influenced by observable market forces) and the authors never defend their consistent assumption that the common value mean is large (100 in their examples) relative to the idiosyncratic means (less than 10).

⁴⁷Indeed, we have made this argument ourselves. Ayres & Goldbart, *supra* note 1, at 48.

they can sometimes be more efficient than either Type-2 or Type-4 liability rules.⁴⁸ But for now it is sufficient to see how nicely joint-veto rules can respond to the correlated-value problem – even if Type-4 liability rules are not feasible.

Remember that the problem with a traditional (Type 2) liability rule was that the defendant may take – not because she has a high idiosyncratic value – but merely because both litigants’ have an unexpectedly high common value realization. The court would like the defendant only to take if its idiosyncratic value is unexpectedly high, but the court can’t observe either the common or idiosyncratic value components. The imperfectly informed court can only set a single damage figure which might induce a defendant to take either because it has an unexpectedly high idiosyncratic value (efficient takings) or because both it and the plaintiff have an unexpectedly high common value (inefficient taking).⁴⁹ But while the court cannot observe whether the defendant is taking because of a high common value, the plaintiff can.

Joint veto rules are well suited to respond to the problem of correlated valuations because these rules allow the other side to *veto* takings that are driven by common value realizations. The problem with the Type 2 rule was that defendants might take merely because the common value component was unexpectedly high. But a joint-veto rule eliminates this problem by allowing the plaintiff to veto takings that are driven by both parties having a high common value. Under a joint-

⁴⁸Id. at 61.

⁴⁹In fact, courts might (and in some contexts) do set different damage figures to regulate the initial taking and subsequent take back options. Ian Ayres and Jack Balkin have shown that these “higher order” liability rules can implement crude auctions that systematically dominate the more constrained “single price” liability rules. Ian Ayres & J.M. Balkin, *Legal Entitlements as Auctions: Property Rules, Liability Rules and Beyond*, 106 YALE L.J. 703, 729-33 (1996).

veto rule, the entitlement will only transfer to the defendant if the plaintiff’s total value (common plus idiosyncratic) is less than the damage amount and if the defendant’s total (common plus idiosyncratic) is greater than the damage amount. Indeed, it can be shown that the optimal joint-veto produces systematically higher expected joint payoffs than the optimal property rule.⁵⁰ Thus, even if pure Type 4 implementations are not feasible, “joint veto” liability rules -- which still harness the litigants’ private information by contemplating non-consensual transfers -- will still tend to dominate property rules.

Kaplow and Shavell can be pardoned for not considering these newfangled joint-veto rules, but their failure to consider the Type-4 rules that Calabresi and Melamed discovered more than 24 years earlier is a more serious error -- an error they probably made by ignoring the implicit option value of liability rules.⁵¹ Just because a plaintiff has the higher average value does not mean that Type 2 liability rules will be more efficient than Type 4. From an option perspective, giving the entitlement initially to a lower valuing defendant and giving the higher valuing plaintiff a taking option can be more efficient if the plaintiff has a systematically more volatile valuation. When the more efficient liability rule is compared to the more efficient property rule, Kaplow and Shavell’s

⁵⁰For these uniform distribution examples, the expected joint profits under the optimal joint-veto rule are identical to the expected joint profits under the optimal Type-4 liability rule. The damages under joint-veto implementations are less extreme than under Type 2 or Type 4 implementations. Instead of relying on more extreme damages to deter inefficient takings (driven by high common value realizations), the joint-veto rules rely on the other side’s veto. *Id.* at 57.

⁵¹Ayres and Talley made a similar error in comparing bargaining under liability and property rules. Ayres & Talley, *supra* note 7, at 1048. Their core numeric example assumes that the defendant’s valuation is less variable than the plaintiff’s valuation, but they ignore the more efficient Type-4 implementation. *Id.*

own examples show that correlated valuations need not undermine their harnessing result.

C. The Lemons’ Problem

All of the foregoing examples make the seemingly innocuous assumption that the original possessor of the entitlement (the plaintiff) has a higher mean value than the non-possessor (the defendant). Kaplow and Shavell reasonably defend this assumption by claiming that the plaintiff’s prior decision to “obtain (or choose to retain) things” signals to a court that they place a high idiosyncratic value on the entitlements.⁵² But the authors’ other assumptions of correlated values and imperfect information undermine our confidence that possessors have higher average valuations.

In probably the most-cited correlated value articles, *The Market for Lemons*,⁵³ George Akerlof showed that an owner of a used car may be unable to sell at any price even though it is commonly known that a particular buyer values the car more highly. The classic lemons’ problem is that when a buyer’s and seller’s valuations are correlated but the seller knows more about the entitlement’s value, a lower-valuing seller may be unable to sell to a higher-valuing buyer. The lower-valuing seller is stuck with the entitlement.

For example, assume that it is commonly known that (a) a seller knows her own value exactly; (b) the buyer’s valuation is $k (> 1)$ times greater than the seller’s valuation; and (c) the buyer only knows that the seller’s valuation for a car is uniformly distributed between 0 and 100. Then if

⁵²Kaplow & Shavell, *supra* note 2, at 760 (“For example, I may purchase my home just because it has higher idiosyncratic value for me than for others: I may particularly like its design, setting, or location.”).

⁵³George A. Akerlof, *The Market for “Lemons”: Quality Uncertainty and the Market Mechanism*, 84 Q. J. Econ. 488, (1970).

k is less than 2, a rational buyer will refuse to trade at any price. For example, if $k = 1.5$, then a buyer considering whether to buy at a price P will believe that the average value of a seller willing to sell at this price is $P/2$ – which in turn implies that the buyer’s expected value of buying such a car is $(k * P)/2 = P * (3/4)$. No rational buyer is willing to pay P for a car that is worth on average only $3P/4$. The buyer vetoes any proposed trade – worrying that she would be buying a lemon (a car whose value is expected to be lower than the price).⁵⁴

Kaplow and Shavell admit that “[t]he assumption that idiosyncratic value is higher for owners means that it will be socially desirable on average for things not to be taken,”⁵⁵ but the possibility of a lemons’ problem should make us uneasy about assuming that a particular person possesses an entitlement because she values it more than non-possessors. Indeed, a more reasonable assumption is simply that possessors – through the very act of possession – will tend to know more about the value of the entitlement. Akerlof’s article teaches, however, that superior seller knowledge plus correlated valuation impedes higher-valuing buyers from consensually purchasing.

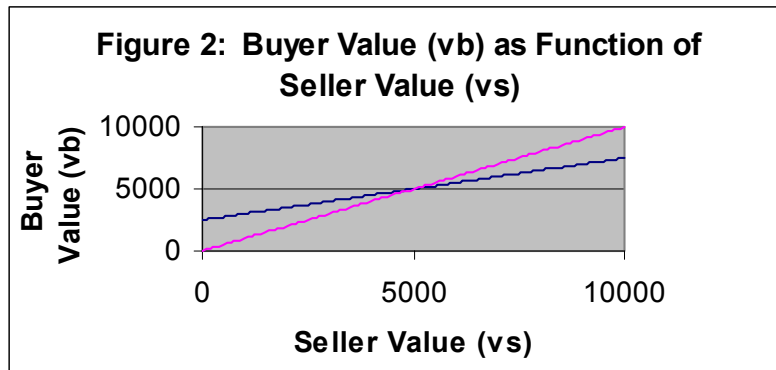
Appreciating the possibility of the lemons’ problem not only qualifies their valuation assumption, but suggests a reason why – counter to Kaplow and Shavell – liability rules may dominate property rules in correlated value settings. The lemons’ problem is that potential buyers refuse to consent to trade – even when the transfer from a social perspective is efficient. But granting plaintiff possessors put options can overcome the lemons’ problem. A put option gives the

⁵⁴More generally the lemons’ problem exists when the buyer’s expected value of the car, given that the seller’s value is less than P , is less than P -- even though the buyer’s expected value is larger than the seller’s expected value: $E_B[v_S | v_S < P] < E_B[v_B | v_S < P] < P$.

⁵⁵Id.

would-be seller the unilateral right to force a sale at a court determined price and thus eliminates the lemons’ problem of inefficient veto.

Consider, for example, an initial possessor (seller) of a used automobile and a potential new owner (buyer) for whom it is commonly known that (a) a seller knows her own value (v_s) exactly; (b) the buyer’s valuation (v_b) is equal to $2500 + .5(v_s)$; and (c) the buyer only knows that the seller’s valuation for a car is uniformly distributed between 0 and 10,000. The assumption about the buyer’s valuation implies (as shown in Figure 2) that the buyer’s value will be higher than the seller’s value when seller’s value is relatively low ($v_s < 5,000$) and the buyer’s value will be lower than seller’s value when the seller’s value is relatively large ($v_s > 5,000$).⁵⁶



The superior knowledge of the seller and the correlated valuation in this example creates a lemons’

⁵⁶While the specific functional form of $v_b(v_s)$ is arbitrary, there will be a general tendency (with value distributions that are positively, but less than perfectly, correlated) for the expected value of one party conditional on the value of another to be less extreme than the value upon which it is conditioned. This can also be seen in both Figures 1 and 2 by the buyer’s valuation intersecting the 45% line from above .

problem. It can be shown that buyers would never agree to pay more than 3,333.⁵⁷ This example thus constitutes a partial lemons’ problem: even though it is socially efficient to trade whenever the seller’s value is less than 5,000, sellers are only able to sell when their value is less than 3,333.

But protecting the seller’s entitlement with a put option to sell the entitlement for 5,000 increases social welfare – producing in this example first-best allocative efficiency. The seller will tend to exercise its put forcing a sale to the buyer when its value is less than 5,000 and the seller will fail to exercise the put when its value is greater than 5,000. And this is just the allocation that an efficiency-minded court would want to implement.

Giving used car owners put options poses real problems of implementation. Seller put options (with a 5000 exercise price) would expose buyers to a negative expected payoff -- this, after all, is why buyers were unwilling to trade consensually in the first place. One response would be to give the potential sellers (of say, 10-year old cars) the following choice: if a buyer expresses interest in your car, you must either pay the buyer 625 to retain your car, or force the buyer to buy your car for 4375. This “pay or be paid” rule would increase the buyer’s expected payoff (and hence buyers’ willingness to express an interest in buying) while still inducing sellers to allocate the entitlement efficiently.⁵⁸

⁵⁷As discussed supra note 54, a buyer will only be willing to purchase if $E_B[v_B | v_S < P] > P$. But given the assumed functional form of $v_B(v_S)$, this inequality is only true if $P < 10,000/3$.

⁵⁸“Pay-or-be-paid” liability rules are discussed in Ayres & Goldbart, supra note 1. Increasing the buyer’s expected payoff would of course reduce the seller’s expected payoff and sellers who know their valuation is slightly below 5000 would have a negative expected payoff. Indeed, there is no mechanism that produces first-best efficiency and yields positive expected payoffs for all possible types. William Samuelson, Bargaining Under Asymmetric Information, 52 *Econometrica* 995 (1984). But if sellers were subjected to this “pay or be paid” regime only ten years after buying

The larger lesson here is that liability rule options may have a systematic advantage in mitigating one of the problems caused by correlated valuations -- the lemons’ problem. When a lemons’ problem is causing a poorly informed party to systematically veto welfare-enhancing trade, a liability rule option (in the form of a put or a call) might eliminate the threat of inefficient veto. Seen through a lemons’ lens – where possessors of tangible entitlements are likely to have systematically better information about their values – correlated values actually militate against the use of property rules that allow both buyer and seller to veto transfers.

III. CRITIQUE OF THE MULTIPLE-TAKINGS CLAIM

Even if correlated valuations do not offer an adequate foundation for the tangibility thesis, it is still possible that the potential of multiple takings undermines the utility of liability rules in protecting tangible entitlements. Kaplow and Shavell independently argued that the potential for two types of multiple takings undermine the feasibility of implementing liability rules. First, liability rules applied to tangible entitlements might give rise to problems of reciprocal takings – in which a plaintiff and defendant engage in a protracted (and potentially endless) series of destructive takings of the same entitlement from one another. Second, liability rules might induce multiple takers to threaten taking thus undermining the incentives of an initial entitlement holder to bargain to retain her entitlement with any individual potential taker. The next subsections analyze each of these problems in turn. The potential for multiple takings poses a real problem, but once again enlightened

a new car, it is possible that sellers ex ante would support its adoption. While ten years later some sellers would be exposed to a negative expected payoff, other sellers would be able to sell their entitlement for a price that would be unattainable through traditional trade.

courts can structure liability rules to economize on the litigants’ private information.

A. *The Reciprocal Takings Problem*

The authors describe the problem thus:

[A] problem with a regime of liability rules is what we call reciprocal takings: if Jack takes my car and the liability award is less than the car's value to me, I would want to take my car back from Jack. In a regime of liability for takings, I could do this. The inevitable result would be tugs-of-war, altercations, frictions of some type. A pure system of liability rule protection would become unworkable.⁵⁹

This quotation suggests again that Kaplow and Shavell are wedded to an extremely non-functional definition of liability rules. The only thing that counts for them is a rule with damages set at the court’s assessment of the plaintiff’s unconditional mean valuation. Under this essentialist view, a “pure system of liability rule protection,” a plaintiff and a defendant could endlessly take a chattel back and forth *at the same damage amount*:

Suppose that, under the liability rule, damages would be only \$75 for taking something worth at least \$100 to its owner and to many others. Then if someone takes the thing, which is likely, the owner would wish to take it right back (returning to the taker the \$75 that the owner received as damages).⁶⁰

If liability damages are set too low initially, then both plaintiff and defendant will have an incentive to take one after the other.

But a moment’s reflection suggests that stationary damages for successive takings is inconsistent with the authors’ own harnessing idea. Continuing with the previous example, if a court initially believes that both the plaintiff and defendant each value an entitlement at 75, it is reasonable

⁵⁹Kaplow & Shavell, *supra* note 2, at 722; see also *id.* at 767 (reciprocal takings “lead inevitably to destructive contests to retain or to take control of things, and thus to the use of force”).

⁶⁰Kaplow & Shavell, *supra* note 2, at 767.

to set the damages for the defendant’s initial taking at this amount. But the very fact of a defendant’s initial taking should make the court revise upward its beliefs about the defendant’s valuation. Since only defendants with above-average valuations would have taken initially, the court should set the plaintiff’s damages for taking back at an amount higher than 75.

Increasing the damages for successive reciprocal takings is the natural way to extend Kaplow and Shavell’s own harnessing result. The goal of damage setting in each round should be for the court to induce a plaintiff or defendant to take only if – given the information available to it – such taking is expected to be a value enhancing transfer. Since the plaintiff knows that the defendant’s initial taking signals a higher valuation, harnessing demands that the plaintiff should only take back if it has an even higher valuation. Kaplow and Shavell assert that the “only apparent solution to the problem of reciprocal takings lies in a mixed system that would employ a liability rule for the initial taking combined with property rule protection of the taker’s possessory right afterwards.”⁶¹ But intermediate solutions between stationary and infinite damages exist which not only make a system of liability rules “workable,” but actually enhance the harnessing effect.

Indeed, Ayres and Balkin showed that courts could set damages at successively higher amounts in a way that effectively auctioned the entitlement – with each successive taking signaling a higher valuation.⁶² They generalized Kaplow and Shavell’s harnessing result – showing how damages could be set so that all dispositive takings tended to enhance value.⁶³ These so-called

⁶¹Kaplow & Shavell, *supra* note 2, at 767-68.

⁶²Ayres & Balkin, *supra* note 49, at 729.

⁶³Under their “dispositive takings principle,” a litigant would only take if its value was higher than the value of the class of adversaries who would not take back. *Id.* While Ayres & Balkin proved

“second-order” liability rules go further than traditional liability rules because they harness the private information of *both* litigants. Ayres and Balkin showed that they can produce systematically higher payoffs than liability rules that contemplate only a single stage of taking.⁶⁴

While these second-order rules may seem bizarre and esoteric, a second-order rule was implicitly implemented to solve a reciprocal taking problem in the venerable common law chestnut, *Vincent v. Lake Erie Transportation Co.*⁶⁵ In that case, the Minnesota Supreme Court held a shipowner liable when his ship damaged a dock while he attempted to moor the ship during a storm—but the court simultaneously acknowledged that the dock owner would have had to pay damages to the ship owner if the dock owner had subsequently unmoored the defendant’s ship, causing it to be damaged. As Ayres and Balkin note:

Vincent [is] a vivid example of how the common law protects an option to take an entitlement (a liability rule) with another liability rule. The dock owner holds the initial entitlement to the physical security of the dock. The shipowner (because of the exigencies of the storm) has a first-stage option to “take” the dock by mooring the ship to it and by paying damages for any injury that results. The dock owner has a second-stage option to unmoor the ship, but at a cost: The dock owner gives up a cause of action against the shipowner for damages and exposes himself to tort liability for any damages to the ship and its crew.⁶⁶

the dispositive taking principle for uniform valuation distributions, Ayres & Goldbart have shown it holds true for more general distributions. Ayres & Goldbart, *supra* note 1, at 79.

⁶⁴Ayres & Balkin, *supra* note 49, at 729.

⁶⁵124 N.W. 221 (Minn. 1910).

⁶⁶Ayres & Balkin, *supra* note 7, at 716. Jon Hanson and Matt Stowe were the first to see this unusual aspect of *Vincent*. See Jon Hanson & Matt Stowe, Lecture Notes, Torts, Harvard Law School (Fall 1996) (on file with *The Yale Law Journal*). Robert Ellickson long ago also proposed a modification of nuisance rules that would amount to a common law implementation of a second-order rule. See Robert C. Ellickson, *Alternatives to Zoning: Covenants, Nuisance Rules, and Fines as Land Use Controls*, 40 U. CHI. L. REV. 681 (1973).

In *Vincent*, the law used a two-staged liability rule with increasing damages to solve a reciprocal taking problem concerning a tangible entitlement. The possibility of reciprocal taking does not mean that courts cannot still harness the litigants’ private information – indeed, reciprocal takings allow courts for the first time to use liability rules to harness the private information of *both* litigants.

B. The Multiple-Takers Problem

Another potential for multiple takings arises if the law grants a number of individuals the option to take non-consensually. Kaplow and Shavell explain:

Under a liability rule, we presume that anyone would enjoy the right to take my car. Thus, even though I would be willing to pay Jack not to take my car if it were inadequately valued by the courts, there would be no point in paying him to desist -- for Jill, or someone else, could come along and take it the next day. Consequently, I would not pay Jack to forbear, and not being paid, he would in fact take my car.⁶⁷

They conclude that the threat of paying a large and undefined class of potential takers might render bargaining “effectively impossible.”⁶⁸

But taking options of liability rules need not be parceled out willy nilly. *Vincent*, for example, shows that under the necessity doctrine courts only give a takings option to potential takers who, because of special exigencies, may have particular needs to encroach on another’s dock. There is no need for courts to give a takings option unless the taker can plausibly claim to be the highest valuing use.⁶⁹ Limiting the class of potential takers to the plausible contenders for efficient ownership is thus one way to mitigate the multiple-takers problem and resurrect the possibility of

⁶⁷Kaplow & Shavell, *supra* note 2, at 722.

⁶⁸*Id.*

⁶⁹See Ayres & Talley, *supra* note 7, at 1085.

bargains not to take.

A second approach is simply to raise the potential damages for such takings. The problem of multiple takers is that too many defendants may threaten to take at a low price. But courts recognizing this problem (and its disabling effect on bargaining) can adjust damages upward to lower the probability of it arising.

When there are numerous potential takers of an entitlement, courts should consider the exchange-value (of potentially selling the entitlement to one of the takers) as well as the use value (of merely using entitlement). This exchange value will be positively correlated with the use value of highest (or second-highest) valuer.⁷⁰ For example, if there are five potential takers – each with a valuation uniformly distributed between 0 and 100, then an analysis of what mathematicians call “ordered statistics” suggest that the expected highest valuation will be 83.33. Elevating damages closer to this ordered statistic amount (which might easily be above the going market price) is the multi-person analog to the dispositive takings principle discussed above. It would induce the single highest bidder to take non-consensually. Interestingly, nineteenth-century Mill Acts created a liability regime that is broadly consistent with this proposal. The New Hampshire Mill Act⁷¹

⁷⁰In many settings the exchange value will be correlated with the second highest value (because the highest valuer will only be forced to outbid the second highest valuer) and optimal damages might, at least in some cases, try to approximate the second highest value which can be seen as an auction-equivalent price. See supra McAfee & McMillan, supra note 31 (showing that many option formats produce expected revenues equaling value of second highest valuing bidder); Ian Ayres & Peter Cramton, *Pursuing Deficit Reduction Through Diversity: How Affirmative Action at the FCC Increased Auction Competition*, 48 STANFORD LAW REVIEW 761 (1996) (applying second-ordered statistic to FCC auction analysis).

⁷¹1868 N.H. Laws, ch. 20, s 3 (set out in *Head v. Amoskeag Mfg. Co.*, 113 U.S. 9, 10-11 (1885)); see also *Head*, 113 U.S. at 20 (relating history of statute).

established statutory damages for the owners of upstream land if the installation of a mill caused flooding. The statute mandated that compensation would be fifty percent above the market value of the land. This 50 percent elevation can help assure that any non-consensual takings by downstream mills were likely to enhance efficiency (even given the potential higher-than-market idiosyncratic values of upstream land owners).⁷²

Alternatively, one could imagine a scheme of sequential takings by different bidders paying successively higher damage amounts to implement a multi-bidder analog to the Ayres & Balkin idea of higher-order liability rules. Once again, the possibility of multiple takings, far from undermining the utility of liability rules, actually allows enlightened (but imperfectly-informed) courts to further economize on the private information.

CONCLUSION

To our mind, the great contribution of *Property versus Liability Rules* is the authors’ reconception of liability rule damages as an allocative device instead of a mere compensatory device. With property rules, the court (in the absence of private bargaining) allocates the entitlement. But with liability rules, the court delegates the allocative decision to a private litigant. Even in the absence of bargaining, the litigant with the taking option can choose whether or not to allocate the entitlement to herself. Setting the damages that a taker must pay equal to the expected harm of the non-taker guides the taker’s allocative decision – so that she will only take when her private benefit

⁷²Richard Epstein interpreted these statutory damages as ensuring a division of the surplus brought about by the forced exchange. See Richard A. Epstein, *Takings: Private Property and the Power of Eminent Domain* 174 (1985).

is greater than the non-taker’s expected cost. This is the harnessing benefit of liability rules.

But in confronting the real problems of correlated valuations and multiple-takings, the authors lost sight of harnessing. Instead of trying to adapt damages to economize on the taker’s private information, Kaplow and Shavell argued that it was better to extinguish the takings option and deter all non-consensual takings.

We disagree. The solution to the problems of correlated valuation and multiple takings is not to enjoin and criminalize such takings but to enlarge the damages for non-consensual takings in ways that redeem liability rules’ potential for economizing on the taker’s private information. Kaplow and Shavell tend to consider such elevated damages as property rules because they deter more non-consensual takings.⁷³

But there is more than a semantic issue at stake in whether elevated damages are termed as “property” or “liability” protections. The essential question is whether courts (and other lawmakers) should structure the law so as to deter all non-consensual takings or so as to intentionally allow non-consensual takings that are expected to enhance value. The tangibility thesis seems to claim that deterrence/property protections tend to dominate when entitlements are tangible, but we have shown that the arguments proffered by Kaplow and Shavell do not explain why courts cannot still profitably

⁷³Kaplow & Shavell, *supra* note 2, at 790. At a few points, the authors acknowledge that liability rules with higher damages might promote efficiency. See also *id.* at 756 (“one can conceive of the two property rules and the liability rule that we studied as all being, in fact, liability rules with different levels of damages: the property rule protecting injurers corresponds to a liability rule with zero damages; the conventional liability rule that we emphasized is the rule with damages equal to courts’ best estimate of harm; and the property rule protecting victims mirrors a liability rule with extremely high, or infinite, damages. . . . [T]he fully optimal liability rule may, in principle, be one with any level of damages.”); *id.* at 762 n.157 (“a liability rule with damages different from average value might perform better than the liability rule with damages equal to average value”).

tailor damages to facilitate non-consensual, value-enhancing takings.

Now that the transaction-cost basis for property rule has been undermined (in part by Kaplow and Shavell themselves), it is natural and laudable to look for a replacement theory to help explain the prevalence of property-like protections. But the tangibility thesis (while providing interesting insights along the way) ultimately does not convince. The search for a satisfying foundation for property rules continues.⁷⁴

⁷⁴Ayres & Goldbart, *supra* note 1, at 103, note a variety of other contenders (such as providing better ex ante investment incentives) that similarly have not withstood sustained analysis.