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Remedies and the Psychology of Ownership

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I. INTRODUCTION

It is surprising that there are cases like *Boomer v. Atlantic Cement Co.*[1] The plaintiffs in *Boomer* were eight homeowners seeking injunctive relief against the dust and noise produced by a neighboring cement plant, the Atlantic Cement Company. The trial court declared

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1. 257 N.E.2d 870 (1970).

Atlantic Cement a nuisance, but refused to enjoin the plant's operations.[2] Instead, the court awarded monetary damages to the plaintiffs for the loss in value to their property attributable to the defendant's activities. The dissatisfied plaintiffs appealed, but ultimately New York's highest court declared that they were not entitled to injunctive relief.[3] That the plaintiffs sued the plant is not surprising; Atlantic Cement's operations produced a tremendous amount of noise and dust.[4] The striking aspect of the case is that the plaintiffs spent the time and money to appeal the type of remedy, even though they had won the right to substantial damages. Clearly an injunction had special value for the *Boomer* plaintiffs—but why?

This Article presents evidence that people do not regard rights protected by damages remedies as being owned in the same way as rights protected by injunctive relief. The former can be taken by another without the right holder's permission, whereas the latter cannot be taken without the right holder's permission. The power to refuse to sell a right is a critical psychological component of ownership, and damages remedies do not include this power. When the trial court refused to grant the *Boomer* plaintiffs an injunction, it took away their power to refuse to sell their rights to Atlantic Cement, thereby undermining their status as owners.

Law and economics has an alternative account of the *Boomer* plaintiffs' motives. Application of the Coase Theorem suggests that the plaintiffs were hoping to use an injunction to extract a large settlement from the defendant.[5] According to Coase, parties regularly trade their legal rights, and so the homeowners might have been hoping to improve their bargaining position before ultimately selling their rights to Atlantic Cement. The right to shut down Atlantic Cement's plant would have been a valuable right, indeed, as the plant had cost $45 million to build and supported a payroll of 300 employees.[6] The eight homeowners could conceivably have demanded a sizeable portion of Atlantic Cement's future revenue stream in exchange for allowing the company to continue operating. Furthermore, the

2. *See* Boomer v. Atlantic Cement Co., 287 N.Y.S.2d 112, 114 (1967).

3. *See Boomer*, 257 N.E.2d at 872.

4. *See* Daniel A. Farber, *Reassessing* Boomer*: Justice, Efficiency, and Nuisance Law*, *in* PROPERTY LAW AND LEGAL EDUCATION: ESSAYS IN HONOR OF JOHN E. CRIBBET 7, 9-10 (Peter Hay & Michel H. Hoeflich eds., 1988) (describing the impact of Atlantic Cement's operations on its neighbors).

5. *See* Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

6. *See Boomer*, 257 N.E.2d at 873 n.* (1970). The trial court believed that Atlantic Cement would be unable to install equipment to reduce the dust and noise, and thus an injunctive remedy would require the plant to cease operations altogether. *See Boomer*, 287 N.Y.S.2d at 113-114.

homeowners had reason to be dissatisfied with the size of the damages remedy that the lower court provided. The *Boomer* plaintiffs, like most homeowners, probably valued their property at an amount greater than the market-price damages that the courts used as a measure of compensation. The present owner of a right is likely to be the party who most values it (or else they would likely have sold it). This suggests that the market-price damages would have undercompensated the plaintiffs. In this view, the plaintiffs were using the leverage that an injunction would provide either to extort Atlantic Cement or to recover the subjective value they had for their homes.

Understanding the *Boomer* plaintiffs' motives is not a mere academic inquiry. *Boomer* is a paradigmatic nuisance dispute. As such, it plays a prominent role in debate concerning the appropriate allocation of and protection for property rights.[7] Courts and legislatures must constantly decide how to allocate and protect rights, and *Boomer* squarely presents both of these issues. The court in the *Boomer* case could have given a right to pollute to Atlantic Cement or given the right to clean air to the plaintiffs. If the court had given rights to the plaintiffs, it could have protected them with monetary damages (a liability rule) or injunctive relief (a property rule).[8] The *Boomer* plaintiffs' motives should matter a great deal to courts and legislatures as they make these choices. Their motives reveal what it is that property owners value, try to protect, and expect the law to protect. If the law does not at least acknowledge these preferences, then it will seem arbitrary and unjust.

If the Coasean account of the *Boomer* plaintiffs' motives is accurate, then there is a clear framework for deciding how to allocate and protect property rights. The law should try to encourage trading by allocating rights in a way that reduces the costs of trade.[9] Furthermore, as Calabresi and Melamed observed, the law should also select a remedy that will reduce the costs of trade.[10] The Coasean account of *Boomer*, however, is probably wrong. It seems unlikely that the homeowners were merely trying to obtain leverage in nego-

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7. The case figures prominently in several casebooks on property and on remedies. *See, e.g.*, JOHN E. CRIBBET ET AL., PROPERTY: CASES AND MATERIALS 669-74 (7th ed. 1996); CHARLES DONAHUE, JR., ET AL., PROPERTY: AN INTRODUCTION TO THE CONCEPT AND THE INSTITUTION: CASES AND MATERIALS 857-66 (3d ed. 1993); JESSE DUKMENIER & JAMES E. KRIER, PROPERTY 969-76 (3d ed. 1993); KENNETH H. YORK ET AL., REMEDIES: CASES AND MATERIALS 400-04 (4th ed. 1985).

8. *See* Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1105-06 (1972).

9. *See* Robert Cooter, *The Cost of Coase*, 11 J. LEGAL STUD. 1, 14 (1982).

10. *See* Calabresi & Melamed, *supra* note 8, at 1106-10.

tiations. The plaintiffs did not appeal the size of the damage award; rather, they appealed the type of remedy. The courts, at least, did not believe that the homeowners were trying to extract a large settlement from Atlantic Cement; they were concerned that the homeowners' pursuit of injunctive relief was an attempt to shut down an important employer.[11]

The critiques of the Coase Theorem arising from recent research in behavioral decision theory provide a somewhat better account of the *Boomer* plaintiffs' motives. This research reveals that people are reluctant to part with commodities they own—a phenomenon known as the "endowment effect."[12] The endowment effect suggests that apart from any idiosyncratic value the *Boomer* plaintiffs felt for their homes, the court's market-price damages would have failed to compensate them fully for the loss they felt. Like the Coasean account, however, the endowment effect cannot entirely explain the plaintiffs' motives. The court did not threaten the plaintiffs' ownership of their property—it merely changed the remedy protecting that ownership interest. Unlike the Coasean account, the endowment effect can explain why the plaintiffs might have been willing to spend more to defend their ownership interests than they would have spent to procure them initially. Unless the plaintiffs believed that injunctive relief was the only means by which they could obtain sufficient monetary compensation, however, the endowment effect alone cannot explain the plaintiffs' dogged pursuit of injunctive relief.

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11. In denying the injunction, the trial court stated its concern with "[t]he defendant's immense investment in the Hudson River Valley, its contributions to the Capital District's economy, and . . . the payment of substantial sums in school and property taxes." *Boomer*, 287 N.Y.S.2d at 114. Likewise, the intermediate appellate court cited "the large number of persons employed by [Atlantic Cement], its extensive business operations and substantial investment in plant and equipment . . . and its payment of substantial sums of real property and school taxes" as justification for denying the plaintiffs an injunction. Boomer v. Atlantic Cement Co., 294 N.Y.S.2d 452, 453 (1968). In its opinion, New York's highest court seemed explicitly aware of the possibility that the parties would bargain around an injunction against Atlantic Cement. *See Boomer*, 257 N.E.2d at 873 ("The parties could settle this private litigation at any time if defendant paid enough money and the imminent threat of closing the plant would build up the pressure on defendant.").

12. *See* Daniel Kahneman, et al., *The Endowment Effect, Loss Aversion, and Status Quo Bias*, 5 J. ECON. PERSPECTIVES, Winter 1991, at 193 [hereinafter Kahneman et al., *Endowment Effect*]; Daniel Kahneman et al., *Experimental Tests of the Endowment Effect and the Coase Theorem*, 98 J. POL. ECON. 98 (1990) [hereinafter Kahneman et al., *Experimental Tests*]; Richard Thaler, *Toward a Positive Theory of Consumer Choice*, J. ECON. BEHAV. & ORG. 1 (1980). For reviews, see Elizabeth Hoffman & Matthew L. Spitzer, *Willingness to Pay vs. Willingness to Accept: Legal And Economic Implications*, 71 WASH. U. L.Q. 59 (1993); Russell Korobkin, Note, *Policymaking and the Offer/Ask Price Gap: Toward a Theory of Efficient Entitlement Allocation*, 46 STAN. L. REV. 663 (1994).

In losing the right to an injunctive remedy, the plaintiffs lost something more than leverage in their negotiations with Atlantic Cement, and lost something distinct from an attachment to their homes; they lost the power to refuse to sell their rights to the quiet enjoyment of their property. The trial court's remedy in *Boomer* left the homeowners with a property right subject to an option held by Atlantic Cement.[13] The trial court allowed Atlantic Cement to violate the habitability of the plaintiffs' homes without negotiating with them or even asking their permission. The plaintiffs' persistence in appealing suggests that the right to refuse to sell one's property is a critical psychological component of ownership. When the trial court declared monetary damages to be the exclusive remedy for the plaintiffs, it took away their right of refusal, thereby undermining their status as owners. This account of the *Boomer* plaintiffs' motives does not mean that they would not ultimately have sold their rights to Atlantic Cement had they won an injunction. Rather, it suggests that they wanted the court to force Atlantic Cement to seek their permission for such a sale.

Research on the endowment effect shows that owners resist parting with their possessions, but an important component of this phenomenon might be that ownership usually includes the ability to refuse to sell a possession. In other words, the endowment effect might depend upon whether the law protects an ownership interest with a property rule or a liability rule. The actions of the *Boomer* plaintiffs, previous research on the endowment effect,[14] and the data presented in this paper suggest that it does. If so, this has significant implications for the law and economics of property and remedies. The endowment effect itself implies that a fundamental aspect of the Coase Theorem is wrong—the initial allocation of a right appears to change people's preferences. If the endowment effect depends upon injunctive relief, however, Coase accurately described rights protected by liability rules, but inaccurately described rights protected by property rules.

The present analysis therefore can be thought of as filling in the lower right-hand box of Table 1, below. Table 1 presents the two basic choices that the law must make concerning property rights. The law must decide who owns what (the allocation question) and how to protect ownership (the remedy question). Coase provided a framework for answering the allocation question and Calabresi and

13. *See* Carol M. Rose, *The Shadow of the Cathedral*, 106 YALE L.J. 2175, 2179 (1997).
14. *See infra* notes 61-79 and accompanying text.

Melamed extended this analysis to the remedy question. The endowment effect presents a challenge to the law and economics framework, but the extent of this challenge remains uncertain. The scope of rights subject to the endowment effect is as yet unknown. Of particular concern to the law will be the question of whether the endowment effect influences people's attachment to rights that are protected by damages remedies.

Table 1: Analysis of Property Rights

Legal Decision on Rights	
Allocation	Remedy
Law and Economics Framework	
Coase Theorem	Calabresi & Melamed
Critique from Behavioral Decision Theory	
Endowment Effect	The Present Project

II. THE LAW AND ECONOMICS OF REMEDIES AND PROPERTY—A BRIEF OVERVIEW

Coase's work provides the foundation for the economic analysis of property rights.[15] The Coase Theorem begins with the premise that, absent any impediment to trade, a legal right will be traded to the party who most values it, regardless of the law's initial allocation of that right.[16] This observation leads to two basic predictions about the law's allocation of rights (in the absence of transaction costs)—invariance and efficiency.[17] According to the invariance thesis, the law's initial allocation of rights cannot affect the ultimate distri-

15. *See* Coase, *supra* note 5.
16. *See id.* at 2-7.
17. *See* Donald H. Regan, *The Problem of Social Cost Revisited*, 15 J.L. & ECON. 427, 427 (1972); *see also* Stewart J. Schwab, *Collective Bargaining and the Coase Theorem*, 72 CORNELL L. REV. 245, 273 (1987) (reviewing these points).

bution of rights.[18] According to the efficiency thesis, the law's allocation of rights cannot facilitate or impede an efficient distribution of rights.

For example, imagine that the law gives the right to clean air to eight homeowners living downwind from a cement factory. Suppose that the homeowners would be willing to sell this right for $10,000[19] and the factory would be willing to buy it for $20,000. The factory will buy the homeowners' rights for some amount greater than or equal to $10,000 and less than or equal to $20,000. If the law instead grants the factory the right to pollute, the homeowners will not purchase the right to clean air from the factory because the factory will demand at least $20,000 to part with it and the homeowners will be unwilling to pay more than $10,000.[20] The homeowners are poorer if the law allocates the right to the factory, but in both cases the factory will end up owning the right, thereby supporting the invariance thesis. This distribution of the right to clean air is also efficient in the sense that the right will be held by the party who most values it (the factory), regardless of the law's initial allocation.[21] Holding aside any impediment to trade, the law's allocation of an entitlement cannot create a social inefficiency.[22]

But as Coase noted, impediments to trade are always present.[23] In the example, if the "cost" (loosely defined) of bargaining between the factory and the homeowners exceeds $10,000, then the benefits of a trade will not be worth its cost, and the parties will not trade. Under these circumstances, if the law grants the homeowners the right to clean air, the air will remain clean, which is an inefficient result under these circumstances. This analysis naturally directs the attention of courts and legislatures towards making allocation decisions that reduce the costs of trade.[24] In its simplest form, this attention to transaction costs can lead to efforts either to allocate a right to

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18. The invariance thesis has been the subject of some debate and is further discussed *infra* notes 54-55 and accompanying text.

19. Assume for the moment that the homeowners have no problem organizing their interests and acting collectively.

20. This analysis assumes that the parties' willingness to pay for a commodity equals their willingness to buy the same commodity.

21. If the landowner owns the right, then the landowner holds $10,000 in benefits and the cement plant holds $0. If the cement plant owns the right, then the landowner holds $0 in benefits and the cement plant holds $20,000. Thus, the total benefits are $20,000 if the right is in the hands of the factory and only $10,000 if the right is in the hands of the landowner.

22. *See* Coase, *supra* note 5, at 8.

23. *See id.* at 15.

24. *See* Cooter, *supra* note 9, at 14; Harold Demsetz, *When Does the Rule of Liability Matter*, 1 J. LEGAL STUD. 13, 25-28 (1972).

the party who is likely to be the owner who most values it, or to allocate a right to the party who can most easily trade it.[25]

The problems associated with collective action are a common source of impediments to trade that the law can address.[26] If a group owns a right that an individual wants, some members of the group might hold out for exorbitant bribes from the individual, which might thwart the transaction. For example, reconsider the example in which the law grants the right to clean air to eight homeowners. Imagine that each values clean air at $1,250, and all must agree to sell their rights in order for the factory to have a clear right to pollute. Once again, there is a potential for $10,000 in gains from trade, but this time, each of the eight homeowners might attempt to claim the $10,000 during negotiations. The possibility that the factory will pay seven of the homeowners all of the potential gains from trade while one homeowner still holds out for more might keep the factory from even entering into negotiations. Unless the homeowners can organize their interests, a trade is unlikely to occur.

Collective action problems in the reverse direction also occur. Suppose that the law allocates the right to pollute to the factory, which values it at $20,000, and each of the eight downwind homeowners values the right to clean air at $3,000. There is a potential gain of $4,000 if the factory sells its right to the homeowners. If seven members of the group organize and pay the factory $20,001 to stop polluting, they will collectively be $999 better off. The homeowner who does not participate in this transaction, however, will realize a $3,000 benefit. This homeowner is a free rider on the efforts of her seven neighbors. Because each of the eight homeowners would benefit from free-riding, they might be unwilling to help buy the rights from the factory. If too many members of the group free-ride, the group will be unable to complete the transaction. Even though there are gains from trade, unless the group can organize its actions and collectively share the costs and benefits of the transaction, a beneficial trade is unlikely to occur.

Calabresi and Melamed asserted that the law can address the problems associated with collective action through judicious choices between types of legal remedies.[27] In particular, they argued that the use of damages remedies can avoid the problem of holdouts.[28] If a legal right is held by a group but protected by a damages remedy,

25. *See* MARK KELMAN, A GUIDE TO CRITICAL LEGAL STUDIES 122-23 (1987).
26. *See* Calabresi & Melamed, *supra* note 8, at 1106-10.
27. *See id.* at 1106.
28. *See id.* at 1106-07.

then instead of bargaining with a group to purchase its rights, an individual could simply take the group's rights and pay the damages. In the example above in which each of the eight homeowners values the right to clean air at $1,250, the law could achieve an efficient result by allocating the right to clean air to the homeowners and protecting it with a damages remedy of $1,250 per homeowner. The factory would choose to pollute if it valued the right to pollute more than the value of the right to clean air, and it could proceed without fear of holdouts. Calabresi and Melamed approvingly cited the remedy in *Boomer* as a good example of their analysis in practice.[29] The court allowed the factory to pollute on condition that it compensate the homeowners for their loss. Calabresi and Melamed argued that the judicious allocation of rights and adoption of appropriate remedies can avoid transaction costs that would otherwise impede the efficient transfer of rights.

Subsequent scholarship has refined the Coase/Calabresi approach to rights and remedies by introducing two additional considerations: strategic barriers to trade and the inaccurate measurement of damages. Ian Ayres and his colleagues have developed a model of rights and remedies that introduces strategic barriers to trade into the law and economics of property and remedies.[30] This model supports using remedies as a means of inducing parties to reveal their true value for commodities in a negotiation, thereby facilitating efficient trade. Ayres and Talley proposed that liability rules tend to induce people to reveal their preferences and make efficient trades, more so than property rules.[31] Ayres and Balkin extended this analysis, demonstrating that legal rules that enable parties to take and then retake commodities create a kind of auction, thereby increasing the likelihood that a commodity will be left in the hands of the party who most values it.[32]

Recent papers by Kaplow and Shavell and by Krier and Schwab have described the consequences of inaccurate measurement of damages.[33] Both papers observed that courts might incorrectly

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29. *See id.* at 1106.

30. *See* Ian Ayres & J.M. Balkin, *Legal Entitlements as Auctions: Property Rules, Liability Rules, and Beyond*, 106 YALE L.J. 703 (1996); Ian Ayres & Eric Talley, *Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade*, 104 YALE L.J. 1027 (1995).

31. *See generally* Ayres & Talley, *supra* note 30.

32. *See generally id.*

33. *See* Louis Kaplow & Steven Shavell, *Property Rules Versus Liability Rules: An Economic Analysis*, 109 HARV. L. REV. 713, 713-16 (1996); James E. Krier & Stewart J. Schwab, *Property Rules and Liability Rules: The Cathedral in Another Light*, 70 N.Y.U. L. REV. 440 (1995).

estimate the value of a right, thereby inefficiently encouraging or discouraging the taking of that right. In the example above, if the factory were causing $1,250 worth of damages per homeowner, but the law provided for a damages remedy of only $250, then the factory would pollute instead of negotiating with the homowners and pay the $2,000 ($250 x 8) damages, thereby saving at least $8,000. The landowners might be able to bribe the factory not to pollute their air, but transaction costs could thwart their efforts. In such a case the law effectively subsidizes the factory at the expense of the landowners. Likewise, if the law provided damages that were too high, transaction costs could prevent the factory from taking the homeowners' rights, even if it would be efficient for it to do so. These two papers agree that inadequate measurement of damages can be a problem for the law and economics framework, although they disagree on the resolution of this problem. Kaplow and Shavell argued that despite the potential inefficiencies that can result from inadequate measurement of damages, liability rules are still superior to property rules in the context of externalities such as pollution.[34] By contrast, Krier and Schwab concluded that liability rules are superior when the danger of transaction costs is high and that property rules are best when the danger that the courts will improperly value harm is high. They also argued that these two circumstances frequently coincide, leading to indeterminacy.[35]

These recent contributions add considerations other than transaction costs to the law and economics analysis, but encouraging efficient trade remains the paramount goal of this framework. Coase and Calabresi have converted discussions on the appropriate allocation of rights and choice of remedies into a discussion of how the law can best encourage trade. But implicit in all this work is the assumption that the parties have fixed preferences for commodities. The allocation of rights can alter what people are willing to trade inasmuch as this allocation affects their total wealth. Also, a right is probably more valuable if it is protected by a property rule than by a liability rule. Beyond these caveats, however, the law and economics framework assumes that people's preferences are exogenous—they do not depend upon either the law's allocation of rights or on the legal remedy that the law provides to protect those rights.

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34. *See generally* Kaplow & Shavell, *supra* note 33.
35. *See generally* Krier & Schwab, *supra* note 33.

III. A CRACK IN THE CATHEDRAL: THE ENDOWMENT EFFECT

It is by now reasonably well-known that at least half of this "exogeneity" proposition is false. Researchers in behavioral decision theory have developed a growing line of evidence that people appear to value a commodity that they own much more than an identical commodity that they do not own.[36] Researchers[37] and legal scholars[38] alike have even observed that this phenomenon, labeled the endowment effect,[39] undermines a founding principle of the Coase Theorem. Even excluding transaction costs, the allocation of a right is "stickier" than Coase had assumed.[40]

A. Demonstrations of the Endowment Effect

Researchers have used several different procedures to demonstrate the endowment effect. In one set of studies experimenters compared the amount people would be willing to pay to purchase a commodity to the amount that they would be willing to accept to sell the same commodity once they already owned it.[41] In these studies, the subjects' minimum "willingness to accept" exceeded their maximum "willingness to pay." This method has been used with actual commodities given to individual subjects[42] and hypothetical commodities in a survey format.[43] Other studies have shown that subjects are generally unwilling to trade away a commodity that they own for a commodity that they do not yet own.[44] In these studies, experiment-

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36. *See* Kahneman et al., *Endownment Effect*, *supra* note 12; Kahneman et al., *Experimental Tests*, *supra* note 12.

37. *See* Daniel Kahneman, et al., *Experimental Tests*, *supra* note 12.

38. *See* Hoffman & Spitzer, *supra* note 12; Cass R. Sunstein, *Behavioral Analysis of* Law, 64 U. CHI. L. REV. 1175, 1179-80 (1997).

39. *See* Richard Thaler, *Toward a Positive Theory of Consumer Choice*, 1 J. ECON. BEHAV. 39, 44 (1980) (coining the term "endowment effect").

40. *See* Hoffman & Spitzer, *supra* note 12, at 99.

41. *See* Kahneman et al., *Experimental Tests*, *supra* note 12; Kahneman et al., *Endowment Effect*, *supra* note 12; Jack L. Knetsch & J.A. Sinden, *Willingness to Pay and Compensation Demanded: Experimental Evidence of an Unexpected Disparity in Measures of Value*, 99 Q.J. ECON. 507 (1984); *see also* Korobkin, *supra* note 12, at 667-69 (reviewing this work).

42. Both of the papers by Kahneman, Knetsch, and Thaler report studies of this type. *See* Kahneman et al., *Experimental Tests*, *supra* note 12; Kahneman et al., *Endowment Effect*, *supra* note 12.

43. Researchers have conducted a host of these types of studies. *See* R.G. CUMMINGS ET AL., VALUING ENVIRONMENTAL GOODS: AN ASSESSMENT OF THE CONTINGENT VALUATION METHOD 35-36 (1986).

44. *See* Kahneman et al., *Experimental Tests*, *supra* note 12, at 1341-42; Jack L. Knetsch, *The Endowment Effect and Evidence of Nonreversible Indifference Curves*, 79 AM. ECON. REV. 1277 (1989).

ers gave subjects one of two commodities and offered them a chance to trade the commodity for a different commodity of similar value. The number of trades in such studies was much lower than expected, suggesting that people resist parting with commodities that they already own.

Perhaps the most striking aspect of the demonstrations of these studies is their subject matter. The endowment effect occurs with possessions as banal as coffee mugs, chocolate bars, and pens.[45] Subjects given these items are generally unwilling to sell or trade them. The endowment effect also occurs in surveys of the value of public goods such as parks and wildlife.[46] People also seem to endow the current level of riskiness that they undertake in a given activity.[47] For example, people are less willing to save money by switching to a consumer product that is more dangerous than one they are currently using than they are to spend money by switching to a consumer product that is less dangerous than the one they are currently using.[48] Thus, the effect has proven robust; it has been demonstrated with different methods in diverse settings.

This diversity means that the endowment effect defies easy explanation. The subjects in some of these studies might have been making strategic offers, hoping to goad someone into selling low or buying high. The subjects knew, however, that they would actually be forced to implement all trades in which their offer (or asking) price was less than (or greater than) the market-clearing price, thereby removing much of the incentive for strategic behavior.[49] Even when the subjects had a chance to practice making offer/ask bids with tokens that had a clearly defined monetary value, a consistent endowment effect was observed when the subjects subsequently made bids on commodities such as a mug.[50] Strategic behavior also fails to account for the subjects' unwillingness to trade commodities.

The fact that something as trivial as a mug is at stake rules out explanations based on heirloom effects, the uniqueness of the commodity, or wealth effects. It should not be surprising that some-

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45. *See* Kahneman et al., *Endowment Effect*, *supra* note 12; Kahneman et al., *Experimental Tests*, *supra* note 12.

46. *See* CUMMINGS ET AL., *supra* note 43, at 35-36.

47. *See* W.R. Dubourg et al., *Imprecise Preferences and the WTP-WTA Disparity*, J. RISK & UNCERTAINTY 115 (1994); Edna T. Loehman et al., *Willingness to Pay for Gains and Losses in Visibility and Health*, 70 LAND ECON. 478 (1994); W. Kip Viscusi et al., *An Investigation of the Rationality of Consumer Valuations of Multiple Health Risks*, 18 RAND J. ECON. 465 (1987).

48. *See* Viscusi et al., *supra* note 47.

49. *See* Kahneman et al., *Experimental Tests*, *supra* note 12, at 1336-38.

50. *See id.* at 1329-36.

one who spends $100 for a wedding band might be unwilling to part with it ten years later for even ten times that amount. In the mug studies, however, the endowment effect is almost instantaneous. The mugs have had no real chance to become a part of the subjects' cherished memories. Neither are the mugs rare or unique commodities.[51] They are among hundreds of identical mugs that subjects know are available for purchase at a bookstore a few hundred yards from the place where the experiment is conducted. Likewise, although giving a party certain commodities might make them so wealthy that their preferences should change, the mug has added only $6 to the subjects' total wealth.

It is important to note that the endowment effect does not mean that ownership increases the value of a commodity to its owner. Psychologists, particularly Daniel Kahneman, have argued that there is no such thing as fixed preferences that guide both purchases and sales.[52] The data indicate that the endowment effect is really only a resistance to parting with a commodity, and ownership does not reflect a change in the value of a commodity to its owner.[53] The endowment effect is merely a part of how people construct preferences, and it indicates only that when choosing whether to part with a commodity, people are somewhat more resistant than a conventional rational model would predict.

B. The Endowment Effect and the Coase Theorem

To be sure, the endowment effect leaves many of the implications of the Coase Theorem intact. The phenomenon does not under-

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51. A commodity's uniqueness might also play a role in the endowment effect. Economists have proposed that uniqueness might entirely explain the endowment effect. *See generally* W. Michael Hanemann, *Willingness to Pay and Willingness to Accept: How Much Can They Differ?*, 81 AM. ECON. REV. 635 (1991); Daniel S. Levy & David Friedman, *The Revenge of the Redwoods? Reconsidering Property Rights and the Economic Allocation of Natural Resources*, 61 U. CHI. L. REV. 493 (1994). Hanemann has shown that a commodity with no adequate substitute will create a non-reversible indifference curve, much as the endowment effect does. Hanemann's theory suggests that the endowment effect is even consistent with rational choice theory. Although uniqueness surely cannot account for the results of the studies of more mundane commodities such as mugs, there is evidence that it influences the size of the effect. *See* Wiktor L. Adamowicz et al., *Experiments on the Difference Between Willingness to Pay and Willingness to Accept*, 69 LAND ECON. 416 (1993). *But see* Jason F. Shogren et al., *Resolving Differences in Willingness to Pay and Willingness to Accept*, 84 AM. ECON. REV. 255 (1994) (presenting data that the endowment effect can be explained entirely by the uniqueness of commodities, at least when an auction procedure is used to elicit preferences).

52. *See* Daniel Kahneman, *Reference Points, Anchors, Norms, and Mixed Feelings*, 51 ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 296, 299-300 (1992).

53. *See* Kahneman et al., *Endowment Effect*, *supra* note 12, at 197 (citing an unpublished study by Loewenstein and Kahneman).

mine Coase's assertion that parties trade their legal rights. The endowment effect does, however, pose problems for both the invariance thesis and the efficiency thesis. As to invariance, the endowment effect demonstrates that transaction costs are not the only determinant of the ultimate distribution of rights. As to efficiency, the endowment effect undermines the idea that there exists some owner who most values a right.

Consider another version of the running example as an illustration of these points. Suppose that Mr. Boomer is a homeowner who expresses an endowment effect for the right to clean air. He would be willing to pay $2,000 to obtain the right to clean air, but would be unwilling to part with it for less than $6,000. Suppose that Ms. Atlantic owns a factory that has the potential to pollute Mr. Boomer's air. She also expresses an endowment effect, albeit a smaller one. She would be willing to pay $2,500 for the right to pollute, but would not part with the right for less than $5,000. If the law allocates the right to clean air to Mr. Boomer, he would be unwilling to sell it to Ms. Atlantic, thereby suggesting that he values this right more than Ms. Atlantic. If the law allocates the right to clean air to Ms. Atlantic, however, Mr. Boomer would be unwilling to purchase it, thereby suggesting that she values this right more than Mr. Boomer. To add to the confusion, in an auction, Ms. Atlantic would outbid Mr. Boomer for the right. Because of the endowment effect, the law's choice among methods of allocating this right determines the ultimate owner rather than a consistent ordering of preferences.

The endowment effect thus undermines the invariance thesis in a way that the literature on the Coase Theorem does not otherwise discuss. Scholars have identified other problems with the invariance thesis.[54] Allocation of valuable rights to someone obviously increases their wealth, which should alter their choices. Furthermore, allocating a right to one activity (e.g., ranching) as opposed to a competing activity (e.g., farming), can alter the equilibrium-relative rates of these two activities in the long run (e.g., more ranchers and fewer farmers).[55] The endowment effect, however, goes beyond these arguments. It implies that the law's allocation of rights will alter people's apparent preferences in the short run, even if this allocation does not change their total wealth. If the endowment effect is widespread, then regardless of transaction costs, wealth effects, or the long-run

54. *See* Cooter, *supra* note 9, at 15 ("[T]here is agreement that the invariance version [of the Coase Theorem] is untenable.").

55. *See* Regan, *supra* note 17, at 432-36. *But see* H.E. Frech, *Pricing of Pollutions: The Coase Theorem in the Long Run*, 4 BELL J. ECON. & MGMT. SCI. 316 (1973).

consequences of favoring one activity over another, the invariance thesis is flawed.

The endowment effect also poses serious problems for the efficiency thesis. If preferences are constructed rather than fixed, then thorny questions arise about what an efficient distribution means. For example, is the socially optimal owner of a commodity the person who would pay the most for it or the one who would demand the most to part with it? As shown in the above example, these are not necessarily the same person and the Coase Theorem provides no answer for this question. Coase himself might argue that his theory was only meant to apply to competitive firms,[56] which might be immune from the endowment effect.[57] It is probably late in the day for that argument, however, as the law and economics literature has moved far beyond this restriction on the application of the Coase Theorem.

Even if there were an appropriate measure of value, the endowment effect always impedes the process of getting rights into the hands of those who most value them. In the example above, if "willingness to pay" is the best measure of value, then Ms. Atlantic is the best owner of the right. She would, however, be unable to purchase it from Mr. Boomer. Likewise, if "willingness to accept" is the appropriate measure of value, then an inefficiency results if the right is allocated to Ms. Atlantic; Mr. Boomer would value it the most under this measure, but he would not be willing to purchase it from Ms. Atlantic.

To be sure, the endowment effect could be considered just another transaction cost, under a liberal definition of that term. Such treatment would resurrect the truth of the tautological aspect of the Coase Theorem (all efficient trades occur in the absence of transaction costs). Unlike other impediments to trade, however, judicious allocation of rights and remedies seemingly can do little to facilitate trade. Merely allocating a right results in an impediment to further trade. Unlike other transaction costs, the law apparently has no power to avoid creating an endowment effect.

If the endowment effect is small, or occurs only in rare circumstances, then it poses little threat to the law and economics framework. But if the effect is large and widespread, its existence reveals fundamental flaws in the law and economics framework. Intuitively,

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56. *See* Stewart J. Schwab, *Coase, Rents, and Opportunity Costs*, 38 WAYNE L. REV. 55, 55 (1991).

57. *But see* Kahneman et al., *Experimental Tests*, *supra* note 12, at 1345.

it seems unlikely that the endowment effect applies to every commodity. Although some studies have shown that the endowment effect influences the activities of actual markets,[58] it seems unlikely that bond or futures traders have any attachment to the commodities that they buy and sell.[59] A call option implies ownership and a put option does not, but surely futures traders do not care whether they are buying or selling a put or a call option, except inasmuch as the trade can increase their wealth. By contrast, the endowment effect can increase the value that people state for a commodity as much as twenty-fold in other contexts.[60] Understanding the extent to which the endowment effect undermines the law and economics framework requires a working theory as to when the effect will occur and how large it will be.

C. Explanations for the Endowment Effect

In some ways, the data on the endowment effect is too impressive. If the endowment effect is not the product of strategic behavior, sentimental attachment, uniqueness, or wealth effects, then why does it occur? Cognitive psychologists have attributed the effect to the broader phenomenon of loss aversion—the tendency for people to attach more importance to losses than to gains.[61] In numerous contexts, psychologists have demonstrated that people sacrifice more to avoid losses than to obtain gains of a similar magnitude.[62] Consequently, people tend to prefer the status quo, which would produce an endowment effect. For example, Tversky and Kahneman have shown that peoples' willingness to undertake a hypothetical job with one of two disadvantages (either a long commute or little social contact) depends upon whether they are already in a job that has the same disadvantage.[63] Tversky and Kahneman attributed this result to loss aversion—subjects were unwilling to part with their current job's principal benefit (either a short commute or social contact) to obtain a different advantage. The status quo changes the preferences that subjects express for the two benefits.

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58. *See* Hersh Shefrin & Meir Statman, *The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence*, 40 J. FIN. 777 (1985).

59. *See* Kahneman et al., *Experimental Tests*, *supra* note 12, at 1328.

60. *See* CUMMINGS ET AL., *supra* note 43, at 35 tbl.3.2.

61. *See* Amos Tversky & Daniel Kahneman, *Loss Aversion in Riskless Choice: A Reference-Dependent Model*, Q.J. ECON. 1039, 1041-44 (1991).

62. *See id.* at 1054-57.

63. *See id.* at 1045.

Attributing the bias to loss aversion, however, only begs the question of when loss aversion occurs and how large an effect it will have on choice. As Kahneman observed, "loss aversion does not affect all transactions."[64] It seems unlikely to be an accident that the mug study was conducted with mugs bearing a symbol of the university that the subjects attended, rather than a blank mug. Similarly, even though researchers have observed a large endowment effect for fancy Swiss chocolate bars,[65] they do not observe an endowment effect for ordinary chocolate bars.[66] In the absence of a theory explaining the variance in the size of the endowment effect, its consequences for the legal system cannot be adequately assessed.

There do appear to be some patterns in the size of the endowment effect and the extent of loss aversion observed. Encouraging the subjects to believe that they have earned the commodity or are otherwise entitled to it in some way increases the size of the effect dramatically,[67] creating a kind of "enhanced loss aversion."[68] A sense of entitlement increases resistance to parting with a possession.

Regret also seems to play an important role in the endowment effect. For example, people refuse to exchange lottery tickets—not because they have some attachment to the paper on which the ticket is printed, but because trading a ticket away makes people worry that they have traded away a winning ticket.[69] A recent study by Korobkin shows that in a legal context, people resist deviating from default rules in contract negotiations.[70] Korobkin attributes this, in part, to the regret that parties might feel if they traded into a regime that has some chance of leaving them worse off.[71] People apparently regret taking action more so than deciding not to take action.[72] Thus, selling a right has more potential for regret than failing to buy the same right, thereby reinforcing the endowment effect.

Responsibility also seems to play a role in the endowment effect. People feel responsible for selling a commodity when their

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64. *See* Kahneman, *supra* note 52, at 301.
65. *See* Knetsch, *supra* note 44, at 1278-81.
66. *See* Shogren et al., *supra* note 51, at 259-61.
67. *See* George Loewenstein & Samuel Issacharoff, *Source Dependence in the Valuation of Objects*, 7 J. BEHAV. DECISION MAKING 157 (1994).
68. Kahneman, *supra* note 52, at 304.
69. *See* Maya Bar-Hillel & Efrat Neter, *Why Are People Reluctant To Exchange Lottery Tickets?*, 70 J. PERSONALITY & SOC. PSYCHOL. 17 (1996).
70. *See* Russell Korobkin, *The Status Quo Bias and Contractual Default Rules*, 83 CORNELL L. REV. 608, 637-47 (1998).
71. *See id.* at 657-60.
72. *See generally* David W. Harles, *Actions Versus Prospects: The Effect of Problem Representation on Regret*, 82 AM. ECON REV. 634 (1992).

conscience suggests that they should not sell it, but they do not feel responsible for failing to buy a commodity when their conscience suggests that they should buy it. In one study demonstrating this phenomenon, experimenters used a young potted tree to elicit an endowment effect.[73] Subjects either were given the tree and allowed to sell it back to the experimenters or were given money and offered a chance to buy the tree. For half of the subjects in both the buy and the sell conditions, the experimenter informed the subject that if they did not take the tree, it would be destroyed. This manipulation increased the size of the endowment effect dramatically. Similarly, some have attributed the exceptionally large endowment effect observed in the studies of contingent valuation of environmental resources, such as the Grand Canyon or the spotted owl, to the tendency for the sellers to feel more responsible for the potential destruction of the resources than do buyers.[74]

One impediment to explaining the endowment effect completely is that although studies such as those just described have found parameters that influence the size of the effect, almost no study has employed a manipulation that eliminates the effect. Studies using tokens that can be exchanged for a fixed amount of cash do not generate endowment effects,[75] but this suggests only that money is not endowed. Some studies do suggest that there are forms of inchoate ownership that do not create an endowment effect. In a footnote in one of the principal endowment effect papers, Kahneman, Knetsch, and Thaler reported that distributing vouchers that would later be exchanged for mugs, rather than mugs themselves, resulted in only a weak endowment effect.[76] This curious finding suggests that the subjects actually have to feel and touch the mug to make it theirs—the right to a mug was not endowed. This finding, although only reported as a footnote describing a pilot study, has important implications for the law. Obviously many areas of law govern rights to collect a commodity, rather than possession of the commodity itself. This exploratory footnote should not be taken as conclusive evidence that the right to collect a commodity is never subject to an endowment

73. *See* Rebecca Boyce et al., *An Experimental Examination of Intrinsic Values as a Source of the WTA-WTP Disparity*, 82 AM. ECON. REV. 1366 (1992).

74. *See* Richard A. Epstein, Babbitt v. Sweet Home Chapters of Oregon*: The Law and Economics of Habitat Preservation*, 5 SUP. CT. ECON. REV. 1, 44 (1997) (discussing this tendency).

75. *See* Kahneman et al., *Experimental Tests*, *supra* note 12, at 1329-31; Vernon L. Smith, *Experimental Economics: Induced Value Theory*, 66 AM. ECON. REV. PAPERS & PROC. 274, 277-78 (1976).

76. *See* Kahneman et al., *Experimental Tests*, *supra* note 12, at 1342 n.7.

effect, but it does suggest that some forms of incomplete ownership might not entail an endowment effect.

Other, indirect support also exists for this theory. Another study showed when subjects are given a probability of obtaining a commodity, they endow the gamble, but do not endow the commodity.[77] Furthermore, one study used a procedure that eliminated the endowment effect for mugs with a university seal.[78] In this study the experimenters employed a multi-trial auction procedure in which the subjects learned the second-highest price after each trial. These researchers were uncertain as to why their repeated-trials auction eliminated the effect, but the instructions for their auction procedure asked the subjects to generate bids as if they did not own the commodities at stake, regardless of their initial status as potential sellers or buyers.[79]

These findings suggest that the endowment effect is sensitive to variations in the form of ownership. Other than the variations reported in these studies, most of the research on the endowment effect has been conducted with a single type of ownership interest—that of complete possession implicitly protected by a property rule. The law obviously creates other forms of ownership, including, most notably, ownership protected by a damages rule. Even though the cognitive mechanisms underlying the endowment effect remain unclear, there are strong indications that any variation from ownership protected by a property rule can influence the size of the effect.

IV. THE PRESENT EXPERIMENT

The previous research on the endowment effect studied rights that are protected by injunctive remedies. The research on the endowment effect therefore does not necessarily apply to rights that are protected only by damages remedies. Whatever other variables influence the size of the endowment effect, the remedy protecting the right is one that is of great interest to the legal system. If the choice of remedy influences the endowment effect, then the law does have some means of controlling the endowment effect's impact on the trading of rights.

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77. *See* George Loewenstein & Daniel Adler, *A Bias in the Prediction of Tastes,* 105 ECON. J. 929 (1995).

78. *See* Shogren et al., *supra* note 51, at 264-66.

79. *See id.* at 267-68.

The remedy is likely to have a strong influence on the size of the endowment effect. A right that is protected by a damages remedy might convey less of a sense of ownership than does a right that is protected by an injunctive remedy. Ownership of a right protected by a damages remedy is not full ownership because the right is, in a sense, shared with any potential interloper. Furthermore, this potential for interference undermines the certainty that an injunctive remedy conveys. An owner of a right protected by an injunctive remedy knows that she will continue to own the right until she voluntarily parts with it. Injunctive remedies convey a sense of certainty and security that damages remedies do not.

The present study used the evaluation of a hypothetical choice to determine whether the endowment effect depends upon the legal remedy available. Two different sets of materials provided a test of the hypothesis in different contexts. Each set of materials presented different facts, but incorporated the same design. The materials either informed the subject that they owned a set of rights and had a chance to sell them ("sell" condition) or that they had an opportunity to buy the same set of rights ("buy" condition). Subjects in the position of a potential seller were offered a sizeable sum of money for their rights—money that could then be used to purchase a different set of rights. To correct for wealth effects, subjects in the position of a potential buyer were told that they had a sizeable sum of money on hand that was about to be used to purchase this same alternative set of rights. Thus, the materials essentially required the subjects to state a preference for one of two sets of rights, and manipulated which ones they already owned (or were about to own).

The materials stated that the rights at stake were protected by one of three types of remedies: an injunctive remedy, a large damages remedy, and a small damages remedy. Only when the right was protected by an injunctive remedy was ownership certain. In the two damages conditions, the materials stated that an interloper might appropriate the rights and pay the damages. In these conditions, subjects who chose to keep or to buy the rights might still be forced to "sell" them involuntarily. The materials stated that an unwanted appropriation was "unlikely" in the conditions in which the damages were large and "likely" in the conditions in which the damages were small. Thus, the study incorporated a 2 x 2 x 3 factorial design: one of two different scenarios with the subject as a potential buyer or seller of rights that were protected by an injunction, a large damage award, or a small damage award.

A. Methods

1. Subjects

The subjects were 804 undergraduates at the University of Illinois, Urbana-Champaign, enrolled in business administration classes. Subjects evaluated the stimulus materials in exchange for course credit. Each subject evaluated materials representing only one of the cells in the factorial design.

2. Materials

In the first hypothetical (read by 344 subjects) the materials asked the subject to imagine that she had graduated and become a successful businessperson. Because of her skills the subject had been asked to serve on the board of directors of a charitable land trust. This trust purchases environmentally sensitive land so as to preserve it in a natural state. The materials stated that a problem had arisen with one of the trust's properties, a wetland known as Henry's Pond, which the trust maintained as a nesting ground for migratory birds. Unfortunately for the trust, a helicopter company had begun operating on a nearby property. This activity was disrupting the birds' nesting behaviors.

The materials in the "sell" condition informed the subjects that the law entitled them to one of three remedies, described below, against the helicopter company. Regardless of the remedy, the materials stated that the helicopter company would offer a large sum of money to the trust in exchange for its rights against the company. If the trust sold its rights, any future interference with the helicopter company's activities by members of the trust would be met with criminal sanctions. Although continued operation by the helicopter company would destroy the ecological value of the pond, the proceeds from the sale of the rights would enable the trust to purchase an island off the Canadian coast which was a breeding ground for seals. The Canadian government had recently opened the area to lobster fishermen, whose activities were disturbing the seals. Ownership of the island would enable the trust to keep the lobstermen at a comfortable distance. Without selling its rights to the pond the trust would otherwise lack the funds necessary to preserve this island.

In the "buy" conditions, the materials gave the subjects a similar choice, albeit in a mirror image. These materials stated that the trust had no rights against the helicopter company's activities and

that any attempt by members of the trust to interfere with the helicopter company's activities would be met with criminal sanctions. Nevertheless, the helicopter company offered to sell the trust its rights to operate and to move its operation away from the pond, thereby restoring its ecological value. If the trust purchased these rights they would be able to enforce the helicopter company's promise to move with one of three remedies, described below. The materials stated that the trust had enough money on hand to pay the helicopter company, but that this money was earmarked for purchasing the Canadian island, described above. Thus in both the sell and the buy conditions, the subjects chose between protecting the pond and protecting the island.

The materials informed the subjects that one of three different types of legal protection attached to any rights that they either retained or purchased with respect to the pond. In the "sell" conditions, the materials indicated that state law entitled the trust to either: (1) a court order requiring the helicopter company to cease its operations (injunctive condition); (2) monetary damages that were so extensive that the helicopter company would probably be unwilling to incur them (high damages condition); or (3) monetary damages that were so low that the helicopter company would probably be willing to incur them (low damages condition). In the "buy" conditions, the materials stated that the agreement with the helicopter company could also be enforced by one of these three remedies.

The principal dependent variable in the study was the subject's willingness to sell or willingness to buy the right to protect the pond. Subjects in the "sell" condition were asked to indicate on a five-point scale whether they would definitely sell their rights to the helicopter company, probably sell their rights to the helicopter company, were not sure, probably not sell their rights to the helicopter company, or definitely not sell their rights to the helicopter company. Subjects in the "buy" condition were asked to indicate whether they would definitely not buy rights against the helicopter company, probably not buy rights against the helicopter company, were not sure, probably buy rights against the helicopter company, or definitely buy rights against the helicopter company. The subjects' responses were then coded on a five-point scale, with a higher score indicating a preference for buying (or not selling) rights against the helicopter company.

The materials also included several questions designed to measure the subjects' understanding of the background story. First, subjects were asked to estimate the likelihood that the helicopter company would continue to operate even if the trust owned the right

to stop them. The subjects expressed this estimate by agreeing with one of five statements of probability, which ranged from "extremely unlikely" to "very likely." This was also coded on a five-point scale, with a higher number indicating greater likelihood. Second, subjects were asked what ecological value the pond would retain if the trust did not own the right to stop the helicopter company. This was also expressed on a five-point scale, ranging from "no ecological value" (coded as a "1") to "a great deal of ecological value" (coded as a "5"). Finally, subjects rated their attitude towards environmental protection on a five-point scale, ranging from "very concerned" (coded as a "1") to "not concerned" (coded as a "5") about the environment.

The second hypothetical (read by 460 subjects) was similar in structure to the first. It included the same six conditions incorporating the 2 x 3 factorial design with initial allocation of a legal right and type of remedy as the independent variables. The background story differed, however. The materials asked the subjects to imagine that they had graduated from school and become a partner in a small, new biotechnology company. The subjects were told that as a result of their efforts to move the partnership from pharmaceutical research to research on new pesticides, the partnership's scientists had developed a new organic pesticide from an endangered Hawaiian plant, the Iwihi bush. The materials stated that the pesticide controlled a fungus that afflicts wheat and that the new product had the potential to replace a set of dangerous chemical pesticides that were filling a $20 million annual market. To market the pesticide, the partnership would need a steady supply of the plant. Unfortunately, the plant was only found on property owned by a chemical company that also manufactured one of the chemical pesticides that the partnership's product would replace.

The materials in the "sell" condition informed the subjects that they had rights to a supply of the plants. This right was protected by one of three remedies, as described below. The materials stated, regardless of the type of protection, that the chemical company had offered the partnership a large sum of money for its rights to the plant. If the subject agreed to sell the rights to the chemical company, then the chemical company would eradicate the plant, driving it into extinction. The partnership would then be unable to market the new pesticide. The money that the chemical company offered, however, would enable the partnership to fund future research, pay off debt, and issue a public offering of stock, which had been the partnership's goal from the outset. Thus, the subjects had to choose between attempting to market the new pesticide (thereby preserving an endan-

gered plant) and achieving financial stability and success for the partnership (thereby allowing the extinction of an endangered plant).

In the "buy" conditions, the materials gave the subjects the mirror image of the choice in the "sell" conditions. These materials stated that the company had developed the new pesticide, but had not yet secured sufficient access to the plant to engage in widespread marketing. The chemical company offered to sell the partnership rights to the plant, which could then be enforced by one of the three remedies. The materials in the "buy" condition also stated that the partnership was on firm financial footing, had paid off all of its debts, and was about to issue a public offering of stock. The chemical company demanded a significant sum for rights to the plant, however, which would force the partnership to undertake a significant debt load and forego its public offering for the time being. The materials stated that if the partnership declined to buy the stock, then the chemical company would eradicate the plant, thereby driving it into extinction.

The materials informed the subjects that one of three different types of legal protection attached to any rights to the plant that they either retained or obtained. Injunctive relief consisted of actual possession of the plants. In the "sell/injunctive" condition, the materials stated that samples of the plant had grown easily in the partnership's greenhouse and that the chemical company could not legally interfere with the partnership's access to an adequate supply of the plant. In the "buy/injunctive" condition, the chemical company offered to sell the partnership the land on which the plant grew, which would thereafter prevent the chemical company from interfering with the partnership's use of the plant. In both of the damages conditions, the partnership's rights to the plants were contractual. In the "sell/damages" conditions, the materials stated that the partnership had entered into a "bio-prospecting" agreement with the chemical company before the partnership had developed the pesticide. This agreement required the chemical company to provide sufficient access to the plant so that the partnership could market any product that it developed. The materials stated that the damages for breach of this contract would be based either on lost profits and would be large, or would consist merely of restitution and would be small. In both of the "buy/damages" conditions, the materials stated that the partnership had not yet obtained a contractual right to a sufficient supply of the plants. The chemical company had offered to enter into such a contract, but it might breach after it learned that the partnership would be producing a highly competitive product. The materials stated that

the damages for breaking the contract would be based either on lost profits and would be large, or would consist merely of restitution and would be small. In all of the damages conditions, when the damages would be large, the chemical company would be unlikely to break the contract, but when the damages would be small, the chemical company would be likely to break the contract.

Once again the dependent variable was whether the subjects were willing to sell their rights to the plant ("sell" condition) or buy rights to the plant ("buy" condition). The subjects indicated their preferences on a five-point scale, similar to that used in the Henry's Pond hypothetical. The subjects' responses were then coded on a five-point scale with a higher score indicating a preference for buying (or not selling) rights to the plant. In this scenario, the subjects also made a definite decision whether to retain (or obtain) rights to the plant.

The materials also included two questions that examined the subjects' understanding of the materials. Subjects were asked to estimate, on a five-point scale, the likelihood that the plant would become extinct should they sell, or refuse to buy, rights to the plant. This was coded on a five-point scale with greater likelihood corresponding to higher numbers. They were also asked whether they would be able to market the new pesticide should they sell, or refuse to buy, rights to the plant. Subjects made both estimates by checking one of five probability estimates: 0%, 0%-10%, 10%-25%, 25%-50%, or 50%-100% (coded as "1" through "5", respectively). The materials also asked the subjects to rate their attitude towards the environment on the same five-point scale used in the Henry's Pond hypothetical.

In sum, both sets of materials forced the subjects to express their preference for retaining a target set of rights as opposed to an alternative set of rights. Subjects were not asked to set a dollar value on these rights, as is sometimes done in contingent valuation studies. In effect, the value of these rights was measured by the subjects' willingness to part with (or unwillingness to obtain) the target set of rights. The binary choice that both hypotheticals provided were more constrained and stylized than the options that might be available in the real world. The ultimate right holder is indeterminate in two of the damages conditions if the subject chooses to retain or buy the target rights, but if the subject sells or refuses to buy the target rights, these rights will certainly end up in someone else's possession. There might be more uncertainty as to the outcome in a real situation. The materials also preclude the possibility that the subjects could sell their rights and then attempt to reacquire them.

The materials also did not give the subjects the opportunity to change the type of remedy, as they might have been able to do in the real world. The subjects in damages conditions did not have an opportunity to buy their way into certainty by bribing the potential interloper for refraining from interfering with the subjects' rights, and the subjects in the injunctive conditions could not sell their right to injunctive relief while retaining a damages remedy.

B. Results

Table 2 reports the mean of the subjects' choices in each cell of the 2 x 3 design for both hypotheticals combined and separately. A lower number indicates a preference for keeping the right in the "sell" condition and a preference for buying that right in the "buy" condition. In the Henry's Pond hypothetical, a lower number indicates a preference for saving the pond (as opposed to saving the seals), and in the Iwihi plant hypothetical, a lower number indicates a preference for saving the Iwihi plant (as opposed to making a public offering of stock). The size of the endowment effect can therefore be calculated by subtracting the mean in the "sell" condition from the mean in the "buy" condition. A positive result reveals a preference for the status quo, a negative result reveals the opposite preference. Across both hypotheticals and all conditions, the subjects exhibited a significant endowment effect,[80] although it was only 0.22 points on a five-point scale. More importantly to this study, the subjects also exhibited a significant interaction between the initial allocation of the right and the remedy.[81] Only when the right was protected by an injunctive remedy was an endowment effect observed. In the injunctive condition, the effect was 0.59 points, whereas it was -0.01 and 0.09 points, respectively, in the high and low damages conditions.

80. $F(1, 792) = 5.81$, $p < .025$. These data were analyzed by an Analysis of Variance (ANOVA) model. Throughout this paper, the term "significant" is used only to identify those statistical conclusions that can be made at the 5% error level ($p < .05$).

81. $F(2, 792) = 6.79$, $p < .025$.

Table 2: Mean Preference for Keeping (or Buying) the Rights

Both Hypotheticals

Initial Position	Remedy			
	Injunctive	High Damage	Low Damage	All
Sell	3.75 (128)	3.18 (137)	3.16 (127)	3.36 (392)
Buy	3.16 (139)	3.19 (129)	3.07 (144)	3.14 (412)
Endowment Effect	+ 0.59	- 0.01	+ 0.09	+ 0.22

Henry's Pond Hypothetical

Initial Position	Remedy			
	Injunctive	High Damage	Low Damage	All
Sell	3.24 (54)	2.90 (58)	2.76 (50)	2.97 (162)
Buy	2.62 (63)	2.54 (55)	2.61 (64)	2.59 (182)
Endowment Effect	+ 0.62	+ 0.36	+ 0.15	+ 0.38

Iwihi Plant Hypothetical

Initial Position	Remedy			
	Injunctive	High Damage	Low Damage	All
Sell	4.26 (74)	3.46 (79)	3.56 (77)	3.76 (230)
Buy	3.71 (76)	3.84 (74)	3.54 (80)	3.69 (230)
Endowment Effect	+ 0.55	- 0.38	+ 0.02	+ 0.07

The two scenarios seemed to produce slightly different results. In the Henry's Pond hypothetical, the endowment effect was largest in the injunctive condition (0.62 points), but a small effect persisted in the other two conditions (0.36 and 0.15 points, respectively, for the high and low damages conditions). In the Iwihi bush hypothetical, the injunctive condition also produced the strongest endowment effect. The low damages condition produced no real effect (0.02 points) and the high damages condition produced a small, reverse effect (-0.38 points). This partial reversal undid the small endowment effect in the high damages condition in the Henry's Pond hypothetical when the data from the two hypotheticals were combined. The apparent differences between the two hypotheticals were illusory, however, as the three-way interaction between the hypothetical, the initial allocation of the right, and the remedy was not significant.[82]

Directly examining the preferences that subjects expressed confirms these results. In the Henry's Pond hypothetical, only the subjects in the injunctive conditions expressed a clear endowment effect. In these conditions, 48.2% of the subjects (26 of 54) were unwilling to sell their rights to the helicopter company,[83] but only 28.6% of the subjects (18 of 63) were willing to purchase rights against the helicopter company.[84] In the high damages conditions, 32.8% of the subjects (19 of 58) were unwilling to sell their rights to the helicopter company, as opposed to 20.9% (17 of 55) who were willing to purchase these rights. In the low damages conditions, 30.0% of the subjects (15 of 50) were unwilling to sell their rights to the helicopter company, as opposed to 26.6% (17 of 64) who were willing to purchase these rights.

The data from the Iwihi bush hypothetical are similar. In the injunctive conditions, 86.5% of the subjects (64 of 74) were unwilling to sell their rights to the plant,[85] but only 69.7% of the subjects (53 of 76) were willing to purchase rights to the plant.[86] This result was almost reversed in the high damages conditions, where 62.0% of the

82. $F(2, 792) = 1.35, p > .25$.

83. Meaning that they stated they would either definitely or probably refuse to sell their rights to the helicopter company.

84. Statistical comparisons were not performed on the numbers reported in this and the next paragraphs, as they are the same data reported in the previous paragraph and Table 2. Within each of the three conditions, roughly equal numbers of subjects in the buy conditions stated that they were uncertain as in the sell conditions.

85. Meaning that they stated they would either definitely or probably refuse to sell their rights to the plant.

86. Within each of the three conditions, roughly equal numbers of subjects in the buy conditions stated that they were uncertain as in the sell conditions. Overall, few subjects evaluating this hypothetical stated that they were uncertain (19 of 460).

subjects (49 of 79) were unwilling to sell their rights to the plant, as opposed to 78.4% (58 of 74) who were willing to purchase these rights. In the low damages conditions, 61.0% of the subjects (47 of 77) were unwilling to sell their rights to the plant, as opposed to 65.0% (52 of 80) who were willing to purchase these rights.

In the Iwihi plant hypothetical, the subjects also made an explicit binary choice. Table 3 reports the percentage of subjects who either chose to retain or obtain the rights to the plant. The endowment effect can be calculated by subtracting the buy percentage from the sell percentage; a positive number indicates an endowment effect and a negative number indicates an opposite tendency. Subjects overall preferred to own rights to the plant. Across all three remedy conditions, this tendency did not depend on the initial allocation of rights.[87] The initial allocation, however, did interact significantly with the remedy.[88] In the injunctive conditions, 87.8% of the subjects were unwilling to sell the rights to the plant, although only 70.7% were willing to purchase them. In the high damages conditions, 64.6% of the subjects chose to sell rights to the plant and 78.4% chose to purchase them. Finally, in the low damages conditions, only 67.5% of the subjects chose to sell rights to the plant while 65.0% chose to purchase them.

Table 3: Percent Who Keep or Buy Rights to the Plant (and n)

Initial Position	Remedy			
	Injunctive	High Damage	Low Damage	All
Sell	87.8 (74)	64.6 (79)	67.5 (77)	73.0 (230)
Buy	70.7 (75)	78.4 (74)	65.0 (80)	71.2 (229)
Endowment Effect	+ 17.1	- 13.8	+ 2.5	+ 1.8

87. $z = .79, p > .4$. These data were analyzed with a loglinear model, which is suitable for a binary dependent measure and categorical independent variables.

88. Both coefficients necessary to identify this interaction were significant in the loglinear model, thereby suggesting that the initial allocation had a different influence on the subjects' preferences in each of the three damages conditions. The first coefficient, distinguishing the endowment effect in the injunction condition from that of the two damages cells, was significant. $z = 2.75$, $p < .01$. The second coefficient, distinguishing the endowment effect in the high damages condition from the injunction effect in the low damages condition, was also significant. $z = 2.81, p < .01$.

The manipulation checks revealed few significant effects of either the initial position or the remedy in either hypothetical. In the Henry's Pond hypothetical, the subjects' beliefs about the likelihood that the helicopter company would continue operations in spite of the trust's rights varied by the initial position[89] and by remedy.[90] Subjects in the "sell" condition rated it significantly more likely that the helicopter company would continue operations even if it kept its rights than subjects in the "buy" conditions (a mean of 3.53 as opposed to 3.14). Subjects in the low damages condition believed it was more likely that the helicopter company would continue operation than did subjects in the high damages conditions (means of 3.77 and 3.23 on a five-point scale, with higher numbers indicating a greater likelihood that the company would continue operations), and subjects in both damages conditions believed it was more likely that the helicopter company would continue operations than did subjects in the injunctive conditions (a mean of 2.91). The interaction between the initial allocation and remedy on this variable, however, was not significant.[91]

The second manipulation check in the Henry's Pond hypothetical unexpectedly produced a significant main effect for initial position.[92] Subjects in the "buy" condition were less likely to believe that the helicopter company's activities would interfere with the pond's ecological value than subjects in the "sell" conditions (by a mean of 0.25 points on the five-point scale). The results did not vary with the remedy, however,[93] nor was the interaction significant.[94]

In the Iwihi plant hypothetical, the subjects believed that the endangered plant would become extinct if they did not retain or obtain the rights to it. Overall, 48.7% indicated that they believed that the plant faced at least a 50% chance of extinction (the highest category available). Only 7.6% stated there was no chance the plant would become extinct, and 18.1%, 10.0%, and 15.5% stated that the chances of extinction were under 10%, between 10% and 25%, and between 25% and 50%, respectively. The responses to this variable did not differ significantly by the initial allocation of the right, the remedy, or the interaction between these two variables.[95]

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89. $F(1, 338) = 9.65, p < .005$.
90. $F(2, 338) = 15.86, p < .001$.
91. $F(2, 338) = 1.12, p > .25$.
92. $F(1,338) = 6.3, p < .025$.
93. $F(2, 343) = 1.37, p > .25$.
94. $F(2, 343) = 0.58, p > .5$.
95. All F-values < 1.6; all p-values > .2.

As to the implications of their decision to their own company, fully 41.0% of the subjects agreed that if they did not obtain rights to the plant, there would be no chance that they could market their new pesticide. Another 34.6% stated that there was less than a 10% chance that they would be able to market the new pesticide; 9.4%, 7.0%, and 8.1% stated that there was a 10%-25%, 25%-50%, and 50%-100% chance that they would be able to proceed without rights to the plant, respectively. Subjects in the "buy" condition were significantly more likely to believe that they could proceed without the rights than subjects in the "sell" condition (means of 2.25 versus 1.88 on a five-point scale).[96] Neither the remedy nor the interaction between the initial allocation of the right and the remedy were significant.[97]

All four manipulation checks correlated significantly with the subject's decision on whether to retain or obtain the rights at stake. In the Henry's Pond hypothetical, the more the subjects believed the helicopter company would encroach on the pond, the less interest they had in owning the rights to protect the pond.[98] Also, the less ecological damage the subjects believed the helicopter company would cause, the less likely they were to retain or obtain the rights against the company.[99] In the Iwihi hypothetical, the more the subjects believed the plant would become extinct if they did not own rights, the greater their preference for purchasing rights to the plant.[100] Finally, the more the subjects believed they would be able to market the pesticide without rights to the Iwihi bush, the less interest they expressed in owning these rights.[101]

Overall, the subjects expressed strong support for environmental protection. Only 10.3% stated that they were "extremely concerned" about the environment, but 52.3% stated that they were "concerned." The remaining statements resulted in 27.2% agreeing that they were "somewhat concerned," 8.2% agreeing that they were "slightly concerned," and 1.4% agreeing that they were "not concerned." Neither the hypothetical, initial allocation of the right, remedy, nor any interaction between these terms significantly affected subjects' concern with the environment.[102] Concern with the environment did not correlate with the decision as to whether to protect the

96. $F(1, 453) = 10.48, p < .001$.
97. All F-values < 1.00; all p-values > .4.
98. $r = .19, t(342) = 3.63, p < .001$.
99. $r = .16, t(344) = 3.00, p < .005$.
100. $r = -.14, t(456) = 3.06, p < .001$.
101. $r = .14, t(456) = 3.09, p < .001$.
102. All F-values < 0.4; all p-values > .5.

pond in the first hypothetical.[103] In the second hypothetical, however, greater concern with the environment correlated with a decision either to retain or to obtain rights to the plant.[104]

C. Discussion

These data clearly support the hypothesis that the endowment effect sometimes depends upon the legal remedy. The subjects in this study exhibited an endowment effect for rights protected by injunctive relief, but not for rights protected by a damages remedy. This result confirms Kaplow and Shavell's assertion that "the inability of others to appropriate my things lies at the core of the notions of 'ownership' and 'property.' "[105] The power to refuse to sell a right seems to be psychologically important to ownership. Property is not truly owned if someone can willfully appropriate it upon payment of a fee. When the rights in this study were subject to an option by another party, they did not produce a feeling of true ownership.

The size of the damages (and therefore the probability of an unwanted encroachment on the target rights) was less important to the subjects. Across both scenarios, the endowment effect was essentially absent from both damages conditions. In the Henry's Pond hypothetical, however, the "low" damages condition appeared to produce a smaller endowment effect than the "high" damages condition. This suggests that in this scenario the important underlying variable was the probability that the helicopter company would interfere with the subject's rights. Low damages produced almost no endowment effect because the rights were so uncertain. High damages decreased the likelihood of an unwanted encroachment on the trust's rights, thereby allowing the subject to endow the rights. When the ownership interest was certain and an injunction was available, endowment was complete. The Iwihi bush scenario, however, produced somewhat contradictory data on the effect of the size of the damages.[106] Thus, the data provide only mixed support for the theory that among incompletely owned rights, the degree of uncertainty influences the size of the endowment effect.

One potential problem with the stimulus materials is that they confounded certainty and the type of remedy. It might be the case

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103. $r = .03$, $t(342) = 0.46$, $p > .5$.

104. $r = 0.21$, $t(458) = 4.6$, $p < .001$.

105. Kaplow & Shavell, *supra* note 33, at 716.

106. To be sure, the two hypotheticals did not produce results that were statistically different. *See infra* note 82 and accompanying text.

that certainty of ownership leads to the endowment effect or that the availability of injunctive relief triggers the effect. In a sense, property rules are really the equivalent of liability rules with damages remedies that are so high that no one would be willing to pay them. Property rules have to be enforced by some remedy as well, and hence could still be taken. In fact, the availability of injunctive relief and certainty of ownership are usually confounded in real situations. Nevertheless, because injunctive relief appears to grant the right holder the absolute power to refuse to sell the right, it might have special meaning for right holders. Future research to determine whether certainty or permission is the key to the endowment effect would be valuable.

The manipulation checks did not suggest alternative explanations for the theory that the legal remedy influenced the endowment effect. Minor variations in the facts necessary to set up each of the six conditions might have made the rights at stake uniquely more or less valuable than they were in the other conditions. For example, in the Henry's Pond hypothetical, subjects were less willing to believe that the helicopter company would infringe upon rights that the company had voluntarily transferred to the trust than rights that the trust owned as a matter of state law. Because the subjects' beliefs about the likelihood that the helicopter company would interfere with the trust's rights correlated with their decision on whether to retain or obtain rights to protect the pond, this result could, in part, account for the endowment effect observed in this study. There was no significant interaction between the initial allocation and the remedy, however, so this artifact cannot explain why the size of the endowment effect depended upon the remedy. In fact, none of the control variables interacted significantly with the two independent variables, even though they all correlated with the subjects' decisions. Thus, they cannot explain the significant interaction between the independent variables. Nevertheless, it would be useful to conduct this experiment with actual commodities, such as a mug or pen, so as to rule out other explanations and tie the results more closely to the previous work on the endowment effect.

One troublesome aspect of the data is that even holding the endowment effect aside, the subjects did not express values for the rights that seem rational. In particular, subjects evaluating the damages conditions seemed insufficiently sensitive to the size of the damages. A right protected by a large damages remedy is, almost by definition, more valuable than an identical right protected by a small damages remedy. Nevertheless, an inspection of Table 2 reveals that

subjects did not consistently express greater affinity for rights in the high damages conditions than in the comparable low damages conditions. It is also unclear what caused the trend towards a *reversal* of the endowment effect in the high damages conditions of the Iwihi plant hypothetical. Had the subjects actually had their own rights (or money) at stake in the scenarios, they might have been more sensitive to the actual value of the rights and the data might have been less noisy. This aspect of the data, however, probably does not undermine the conclusions related to the endowment effect. Research on the endowment effect conducted with actual commodities and actual money reveals the same endowment effect that survey research does. Nevertheless, the anomalies in the data in this study also argue for replication with actual commodities.

V. IMPLICATIONS AND CONCLUSIONS

The data in this study do not, however, imply that all rights protected by damages remedies are immune from the endowment effect. My right to my left arm is, in one sense, protected by a liability rule, but it seems likely that there is an endowment effect for body parts.[107] Rather, the data in this paper support the thesis that rights protected from intentional interference by damages remedies are not endowed. In fact, the law gives even greater protection to body parts than an injunction—body parts are inalienable.[108] Anyone who intentionally takes my arm risks criminal liability, whether she does so with or without my permission. It may be that the endowment effect for inalienable possessions is even greater than it is for possessions protected by injunctive relief.[109]

The results of this study restore the law's place as a mechanism for facilitating trade. If the endowment effect is a ubiquitous phenomenon, unaffected by the legal remedy attached to rights, then the law has to contend with a constant barrier to trade. The results of this study, however, indicate that the law has the ability to reduce the endowment effect by favoring damages remedies. If the endowment effect is properly viewed as an unwanted impediment to trade, or as a

107. The risk of a bodily injury produces an endowment effect. *See* Viscusi et al., *supra* note 47.

108. *See* Calabresi & Melamed, *supra* note 8.; Margaret Jane Radin, *Personhood and Property*, 34 STAN. L. REV. 957 (1982); Margaret Jane Radin, *Market-Inalienability*, 100 HARV. L. REV. 1849 (1987).

109. The endowment effect for commodities associated with life and limb elicit a large endowment effect as compared to more ordinary commodities. *See* Shogren et al., *supra* note 51.

transaction cost, then these results add to the case against property rules. Removing the right to injunctive relief from a possession would eliminate the attachment that people feel for their rights, thereby facilitating trade.

This conclusion supports the arguments made by other scholars who have compared property rules and liability rules. The papers by Calabresi and Melamed, Ayres and Talley, and Kaplow and Shavell all favored liability rules because of their ability to facilitate trade.[110] The results of this study could be taken as additional support for the claim that property rules impede trade. Property rules create an endowment effect which impedes transactions, but liability rules do not. The results also suggest that people resist entering into more complicated transactions, such as selling a call option in a right otherwise protected by a property rule. To the extent that disfavoring property rules can be taken as the main implication of these data, then this paper is consistent with the recommendations of previous law and economics scholarship. There is, however, one inconsistency between the conclusions of this paper and previous work comparing property rules and liability rules. Frech has argued that the invariance thesis is true for property rules, but not for liability rules.[111] By contrast, this study indicates that the invariance thesis is correct for liability rules, but not for property rules.

This study also supports the common law's general presumption in favor of legal over equitable remedies. Equitable remedies are traditionally difficult to secure.[112] Whatever other justifications support the common law's bias against equitable relief, this bias might also reflect the law's effort to defeat people's tendency to become overly attached to their possessions. This assumes, of course, that the available remedy actually affects people. If people are generally unaware of what remedy the law makes available, a change in the remedy is obviously unlikely to have any affect on people's attachment to their possessions.[113] Alternatively, even though the data in this study

110. *See generally* Ayres & Talley *supra* note 30; Calabresi & Melamed, *supra* note 8; Shavell & Kaplow, *supra* note 33. In fact, the work of Ayres and Talley inspired the study described in this paper.

111. *See generally* H.E. Frech III, *The Extended Coase Theorem and Long Run Equilibrium: The Nonequivalence of Liability Rules and Property Rights*, 17 ECON. INQUIRY 254 (1979).

112. *See* DAN B. DOBBS, DOBBS LAW OF REMEDIES 57 (2d ed. 1993) ("The equity system treats access to its remedies as at least in part a privilege."). *But see* Richard A. Epstein, *A Clear View of the Cathedral: The Dominance of Property Rules*, 106 YALE L.J. 2091 (1997) (arguing that property rules are widespread and common).

113. *See* Emily Sherwin, *Introduction: Property Rules as Remedies*, 106 YALE L.J. 2083, 2087-88 (1997).

suggest otherwise, it is possible that the law's allocation of the entitlement has an influence on people that far overshadows the influence of the remedy.[114]

The endowment effect is more than just an impediment to bargaining, however. It is an integral part of how people feel about their possessions and rights. The presence of property rules and injunctive relief (and perhaps even inalienability) in the common law might itself be attributable, in part, to the endowment effect and loss aversion. The law might reflect people's attachment to certain possessions, in which case it would be inappropriate to try to undermine this attachment by changing the law.[115] Even though equitable relief is rare, it may be that the common law has made it available in those situations in which the endowment effect is particularly strong. If so, it might be inappropriate to tinker with the remedy in an effort to undermine the effect.

To return to the *Boomer* plaintiffs, remember that they were an angry group. At the outset of their lawsuit, they likely believed that the law protected their interests in the habitability of their houses and, consequently, they had endowed this right. Until Atlantic Cement moved in next door, they lived secure in their belief that, although they might someday sell their houses, the sale would be on their terms and with their permission. The trial court's novel remedy, while economically sound, was a psychological insult. Property rights and remedies have a psychology as well as an economics. Ownership matters to people in ways that conventional economic analysis overlooks, and remedies matter in ways that research on the endowment effect has heretofore overlooked.

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114. *See generally* Dale A. Nance, *Guidance Rules and Enforcement Rules: A Better View of the Cathedral*, 83 VA. L. REV. 837 (1997) (arguing that the allocation decision matters to people much more than the remedy).

115. *See* David Cohen & Jack L. Knetsch, *Judicial Choice and Disparities Between Measures of Economic Values*, 30 OSGOODE HALL L.J. 737 (1992) (arguing that many areas of law recognize and accommodate the endowment effect).

APPENDIX A: SAMPLE STIMULUS MATERIALS FOR HENRY'S POND HYPOTHETICAL

("SELL/INJUNCTIVE" CONDITION)

Executive Decision Making Problem

Imagine that you have graduated and moved on to become a successful business person. Due to your success and ability, you have been asked to serve on the board of directors for a non-profit environmental organization, The Nature Land Trust. This organization identifies environmentally sensitive lands that are at risk of development and purchases them from the landowner. The organization's many volunteers then maintain the property in a natural state. With your advice and assistance, your group has raised hundred [sic] of thousands of dollars and now preserves thousands of acres of environmentally sensitive properties throughout North America.

Recently, your organization purchased "Henry's Pond" in a rural part of Southern Wisconsin. The area consists of 50 acres of swampy, undeveloped land with a large pond in it. The Pond is frequented by rare species of migrating ducks and geese many of which use it as a nesting ground. Additionally, many geese stop at the pond for several days during their annual migration. Your group spent years raising the money to purchase Henry's Pond, and considers it one of their most sensible acquisitions.

A problem has arisen with Henry's Pond. A helicopter company, Midwest Transport, Inc., has recently purchased and developed property adjoining Henry's Pond. Midwest runs charter helicopter flights from downtown Chicago to various cities throughout Wisconsin. The Company has constructed a number of helicopter pads and hangers, and now uses the site as its main heliport. Its principle helicopter pad is just off of the northern end of the Trust's Property, and is within 150 yards of the northern banks of Henry's Pond.

Helicopters and birds do not mix well. The noise from the nearby helicopters has driven many of the birds away from the pond. Furthermore, those that remain have refrained from nesting, and are unlikely to reproduce. Many birds have also gotten caught in helicopter blades, killing them and damaging helicopters. Although it is unlikely that bird-helicopter encounters would result in a disastrous helicopter crash, the heliport has essentially destroyed the ecological value of Henry's Pond.

Midwest and the Trust have exchanged letters on the matter, which have taken an increasingly angry tone. The Trust is unhappy about Midwest's impact on its sanctuary and Midwest is unhappy about the number of birds that the Trust's activities continue to attract in spite of the noise. The Trust's Board of Directors has asked its attorneys to review the situation and assess its options.

Fortunately, the attorneys agree that Midwest's activities constitute a nuisance under Wisconsin law. Property law in the State of Wisconsin protects "ecological" uses of land and is well-suited to protecting private wildlife sanctuaries. Midwest may not legally continue operating its heliport. If Midwest continues to disturb the Pond, the Trust could sue to obtain a court order against Midwest to refrain from such interference. Midwest would almost certainly obey such an order, since the penalty for violating it would be a severe criminal contempt of court sanction.

Midwest has apparently made a similar conclusion. Hoping to improve its image as a friend of the environment, however, Midwest has offered to pay the Trust for the right to continue to operate its heliport at a reasonable price and on favorable terms. If Midwest pays the Trust, Midwest could legally continue operating its heliport. If members of the Trust then took any steps to interfere with Midwest's activities, Midwest would be able to sue to obtain a court order against the Trust to refrain from such interference. Members of the Trust would almost certainly obey such an order, since the penalty for violating it would be a severe criminal contempt of court sanction.

The Trust obviously has limited funds. Money from the sale of this right to Midwest would increase the budget for other projects. In particular, if Midwest pays the Trust, it will have enough money to purchase an island off the coast of Eastern Canada that is a breeding area for the rare harp seal. The island ("Seal Island") is currently owned by the Canadian government, which has begun allowing fishermen to place lobster traps just off its shores. The fishermen mean no harm, but now disturb what would otherwise be a prime breeding ground for the seals. Purchase of Seal Island would allow the Trust to keep the fishermen at a comfortable distance. Furthermore, if fishermen are not kept away from the island this spring, the seals will probably stop using the island indefinitely. Thus, it is critical that the Trust purchase the island as soon as possible. The sale of rights to Henry's Pond would make it possible to buy Seal Island, but otherwise the Trust lacks the funds to buy Seal Island in time.

Ecologists in the group are divided over which project would be more valuable. Both the migrating birds of Henry's Pond and the harp seals are rare and verge on being endangered. Some also argue that it makes sense to sacrifice Henry's Pond for other projects. Others contend that the job of protecting Henry's Pond is complete and the Trust should not sacrifice what it has already gained. All want your opinion, as a valued advisor.

What do you suggest that the Trust do? (Check the option that best reflects your opinion)
___ Definitely do not sell the rights to Midwest and do not purchase Seal Island
___ Probably should not sell the rights to Midwest and do not purchase Seal Island
___ Don't know which to do—too close to call
___ Probably should sell rights to Midwest and purchase Seal Island
___ Definitely should sell rights to Midwest and purchase Seal Island

If the Trust decides not to sell Midwest's rights to operate, how likely is it that Midwest will operate the heliport near the Pond in spite of the Trust's newly acquired rights?
___ Extremely unlikely
___ Possible, but very unlikely
___ Somewhat likely
___ Likely
___ Very likely

If the Trust decides to sell Midwest's rights, what ecological value, if any, will the Pond retain?
___ Basically no ecological value will remain
___ Very little ecological value will remain
___ Some small ecological value will remain
___ A moderate level of ecological value will remain
___ A great deal of ecological value will remain

Which of the following best reflects your position on the environment?
___ I am extremely concerned about protecting the environment
___ I am concerned about protecting the environment
___ I am somewhat concerned about protecting the environment
___ I am slightly concerned about protecting the environment
___ I am not concerned about protecting the environment

APPENDIX B: SAMPLE STIMULUS MATERIALS FOR IWIHI BUSH HYPOTHETICAL

("SELL/INJUNCTIVE" CONDITION)

Business Decision Making

Imagine that you graduated many years ago. After school, you organized a start-up biotechnology company. You provided the business and finance background for the company with four other partners who have advanced degrees in various sciences. Your firm has worked on a number of projects, some of which generated viable products, although your firm has not had any resounding financial success. This has occasionally led to some lean and difficult financial times for your young company, but you have always managed to find financing to tide you over any rough periods.

One year ago, you made a momentous decision for your company. After careful study, you proposed to abandon the company's focus on therapeutic drugs and to begin working on new, organic pesticides. You persuaded your partners that without this adjustment, competition from existing pharmaceutical companies would eventually make your venture unprofitable. Although your proposal sparked heated disagreement among your partners, you ultimately won them over.

Shortly thereafter, your new strategy paid off in a number of small successes and one product with vast potential. Using the sap from a rare Hawaiian plant, the Iwihi Bush, one of your partners extracted an enzyme that, when sprayed on wheat, makes it virtually immune to a common, destructive fungus. Currently, chemical pesticides are available that perform the same function, but all of these are known carcinogens. Such pesticides have increasingly been found in ground water throughout the Midwest and may be the cause of numerous health problems in farm workers. Your new substance (which you call Iwihi-101) has no such side effects. This new product has enormous potential, and could replace pesticides that now have $20 million in annual sales, collectively.

There are some problems with your efforts to go forward with Iwihi-101, however. The Iwihi Bush is an endangered species found only in a small valley on the island of Hawaii, on land owned entirely [sic] the Del-Mott Fruit Company. Del-Mott allowed your partners onto its land to bio-prospect for valuable plants, and allowed them to remove several specimens, which now grow in your company's greenhouse. Since the discovery of Iwihi-101, however, Del-Mott has re-

stricted access to its property. You have learned that Del-Mott is owned by a much larger chemical company, which produces one of the pesticides with which Iwihi-101 would compete. Del-Mott subsequently destroyed all of the Iwihi Bushes on its property, apparently in an attempt to keep your company from developing its new pesticide. Fortunately, your partners are certain that the plants can be grown in greenhouses to provide an adequate supply for commercial sale of Iwihi-101.

Del-Mott initially demanded the return of all Iwihi Bushes in your possession. Fortunately, your attorneys inform you that you need not do so. When it allowed your partners to remove the bushes, Del-Mott effectively relinquished its right to those plants and they now belong to your company. Indeed, Del-Mott's subsequent behavior suggests that they agree with your attorneys. They have offered to buy all of the plants in your possession. Under the terms offered by Del-Mott, you would assure them that you have provided all samples, seeds, and cuttings from the Iwihi plants. Should you then fail to turn them all over, Del-Mott could later get a court order requiring you to return them, and then a failure to do so would result in a criminal contempt sanction.

If you sell the plants to Del-Mott, you would not be able to market Iwihi-101 and you believe that Del-Mott will destroy the plants, leaving the species extinct. They have, however, offered a substantial sum for the return of the plants. They have offered enough money that your company would be able to engage in substantial research and marketing efforts for its other products. You would also be able to eliminate all of your firm's debt load and have enough assets left over that you would be able to issue a public offering of stock, which has been your primary goal since you started the company. Such an offering would put your company on a firm financial footing for an indefinite period.

What do you suggest that your company do? (Check the option that best reflects your opinion)

___ Definitely should not sell the plants to Del-Mott
___ Probably should not sell the plants to Del-Mott
___ Don't know which to do—too close to call
___ Probably should sell the plants to Del-Mott
___ Definitely should sell the plants to Del-Mott

If you had to make a choice now, which would you do? (Circle one)

Do not sell the plants Sell the plants

Why? (Briefly)

If you sell the plants, what is the likelihood that the Iwihi Bush will become extinct?
___ No chance that the Iwihi Bush will become extinct
___ 0-10% chance that the Iwihi Bush will become extinct
___ 10-25% chance that the Iwihi Bush will become extinct
___ 25-50% chance that the Iwihi Bush will become extinct
___ 50-100% chance that the Iwihi Bush will become extinct

If you sell the plants, what are the chances that your company will be able to market Iwihi-101?
___ No chance that your company will be able to market Iwihi-101
___ 0-10% chance that your company will be able to market Iwihi-101
___ 10-25% chance that your company will be able to market Iwihi-101
___ 25-50% chance that your company will be able to market Iwihi-101
___ 50-100% chance that your company will be able to market Iwihi-101

Which of the following best reflects your position on the environment?
___ I am extremely concerned about protecting the environment
___ I am concerned about protecting the environment
___ I am somewhat concerned about protecting the environment
___ I am slightly concerned about protecting the environment
___ I am not concerned about protecting the environment