Revealing Options

Lee Anne Fennell

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ARTICLES

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CONCLUSION
REVEALING OPTIONS

Lee Anne Fennell*

Legal scholars are beginning to explore how the options template, borrowed from finance, can be applied to legal problems outside the realm of finance. This Article uses the options framework to add a new, intermediate entitlement form to the property rule/liability rule schema pioneered by Guido Calabresi and Douglas Melamed. Building on a fascinating but underused literature on self-assessed valuation mechanisms, I propose an entitlement form that would require entitlement holders to create options for others (or for their future selves). These "entitlements subject to self-made options," or "ESSMOs," are capable of powerfully and elegantly addressing one of the most intractable problems in property theory — unknown subjective valuations. By requiring a party to package her subjective valuation in the form of an option — that is, a "revealing option" — the ESSMO dodges the primary problems associated with property rules and liability rules while harnessing advantages of each. The real payoff of this approach comes in dynamic, multiparty "commons" settings. Extending my earlier work, I show how the ESSMO can transform environmental controls, land conservation, and aesthetic controls in private neighborhoods. I also illustrate how revealing options can address intertemporal collective action problems in institutions, as well as time-inconsistent preferences in individuals (such as the smoker who wishes to quit).

INTRODUCTION

People do not always tell the truth about the value they place on things.1 Even those who have no intention of lying will find that the truth they tell in a given context is shaped by their knowledge of

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the implications of the valuation statement. The resulting opacity of subjective valuations creates design problems for law. For example, difficulties in discerning true subjective valuations complicate both public and private efforts to efficiently address environmental spillovers — from the aesthetically annoying to the ecologically disastrous. Simply leaving matters to markets does not do the trick; disingenuous statements of valuation hamper private bargains as well as centralized solutions. An interesting challenge, then, is to structure legal entitlements in a way that induces people to truthfully reveal their valuations.

This Article explores one mechanism for prompting such revelations — entitlements that require the entitlement holder to craft an option to which other parties can respond. Consider the prototypical...

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3 The word “true” introduces an ambiguity. Some scholars have used a notion of “true preferences” to refer to those preferences that someone would have if they were perfectly informed and rational, not their actual or “manifest” preferences. See, e.g., Thomas M. Scanlon, The Moral Basis of Interpersonal Comparisons, in INTERPERSONAL COMPARISONS OF WELL-BEING 17, 28–29 (Jon Elster & John E. Roemer eds., 1991) (discussing scholarship that takes this approach). I use the phrase “true subjective valuation” to reference an actual or honest valuation, not one that has been cleansed or corrected in any way.

4 Efficiency requires that an entitlement change hands if — but only if — another party values it more than its current holder. Under the Pareto criterion, any move must make at least one party better off without making anyone else worse off. When no further moves of this sort are possible (that is, making anyone better off would require making someone else worse off), a Pareto efficient state has been reached. See, e.g., ROBERT Cooter & THOMAS ULEN, LAW AND ECONOMICS 16–17 (4th ed. 2004).

5 See, e.g., Farrell, supra note 1, at 115 (discussing models showing that “bargaining is typically inefficient when, as is likely, each bargainer knows something relevant that the other does not, such as his payoff from a successful agreement”); id. at 116–17 (noting the importance of considering private information in comparing institutional arrangements, instead of recognizing only governmental difficulties in assembling information while unrealistically assuming private bargainers have perfect information). For example, unknown subjective valuations can fuel a holdout or anticommons problem. See, e.g., Lee Anne Fennell, Common Interest Tragedies, 98 NW. U. L. REV. 907, 951 (2004) (explaining how hidden valuations facilitate parties’ attempts to “hold out” for a larger share of the surplus); Michael A. Heller, The Tragedy of the Anticommons: Property in the Transition from Marx to Markets, 111 HARV. L. REV. 621 (1998) (describing an anticommons dynamic in which multiple parties hold an effective veto); Michael A. Heller & Rebecca S. Eisenberg, Can Patents Deter Innovation? The Anticommons in Biomedical Research, 280 SCIENCE 698 (1998) (applying anticommons analysis to the biomedical field).

dispute between a polluting factory and a neighboring homeowner.\textsuperscript{7} As Guido Calabresi and Douglas Melamed explain, law must decide both who shall hold the entitlement to the air quality and how that entitlement will be protected.\textsuperscript{8} From an efficiency perspective, we would want the entitlement to end up in the hands of the party who values it the most — whether or not the entitlement was originally assigned to that party. If we could identify the higher-valuing party, the law could simply allocate the entitlement to that party.\textsuperscript{9} Because we cannot readily tell who values an entitlement more, a tension exists between strongly protecting the subjective valuation of the party who originally receives the entitlement and facilitating a transfer to another party who may actually have a higher subjective valuation.

The two basic means of protecting alienable entitlements — property rules and liability rules — set up different protocols for entitlement transfer.\textsuperscript{10} These protocols present mirror-image difficulties in

\textsuperscript{7} This stock example, which appears frequently in the literature on entitlements, is patterned after Boomer v. Atlantic Cement Co., 257 N.E.2d 870 (N.Y. 1970). See, e.g., Carol M. Rose, The Shadow of The Cathedral, 106 YALE L.J. 2175, 2175–76 (1997).


\textsuperscript{9} Of course, the Coase Theorem holds that if parties could costlessly bargain with each other, an efficient result would be reached regardless of who was assigned the entitlement initially. See R.H. Coase, The Problem of Social Cost, 3 J.L. & Econ. 1, 2–15 (1960). It would therefore make no difference whether the entitlement was protected by a property rule or a liability rule. See, e.g., Kaplow & Shavell, supra note 8, at 720; Polinsky, Resolving Nuisance Disputes, supra note 8, at 1088–92.

\textsuperscript{10} See Calabresi & Melamed, supra note 8, at 1092. Calabresi and Melamed also discuss a third category of entitlement protection — inalienability rules that prevent certain transfers from occurring. See id. at 1092–93, 1111–15 (defining inalienability rules and discussing some justifications for them).
addressing the core problem of unknown subjective valuations.\footnote{11} Property rules are quite protective of the idiosyncratic valuations of entitlement holders,\footnote{12} but they also leave room for false valuation statements that can lead to bargaining impasse.\footnote{13} For example, if a property rule protects the resident's right to clean air, she can demand a price much higher than her true valuation to give up that right. These strategic efforts may block the transfer of the entitlement to the factory even when such a transfer would be efficient.

A liability rule sidesteps this potential impasse by allowing unilateral transfers at a price established by a third party.\footnote{14} In addition, liability rules are capable of harnessing private information about valuations in ways that property rules cannot.\footnote{15} Liability rules can allow inefficient transfers to occur, however. For example, if the damage amount for pollution is set too low, the injured party may lose her entitlement to clean air at a price that is far lower than her true subjective valuation.\footnote{16}


\footnote{12} See, e.g., Robert C. Ellickson, Alternatives to Zoning: Covenants, Nuisance Rules, and Fines as Land Use Controls, 40 U. CHI. L. REV. 681, 736 n.192 (1973) (noting that consensual bargaining solutions have the advantage of allowing subjective assessments of value); Henry E. Smith, Property and Property Rules, 79 N.Y.U. L. REV. 1719, 1785 (2004) ("The attraction of property rules is that they protect individuals' values without their having to be able to justify these values or even reason about them at a conscious level.").

\footnote{13} See, e.g., Fennell, supra note 5, at 983 (discussing the potential for impasse when parties attempt to strategically capture surplus through false valuations); Polinsky, Resolving Nuisance Disputes, supra note 8, at 1078 (observing that injunctive remedies can lead to "unsuccessful extortion" and can thereby preclude an efficient resolution).

\footnote{14} Under a traditional liability rule, the party who is not originally assigned the entitlement holds a "call option" to obtain the entitlement at a price established by a third party. See, e.g., Morris, supra note 8, at 852-54 (noting the structural equivalence between calls and liability rules). For example, a factory might be given a "call option" to pollute upon the payment of damages. The converse arrangement, which places both the entitlement and the unilateral power to transfer it in the same party's hands, is also possible. In that case, the original entitlement holder also holds a "put option" to force its transfer to the other party at an established price. See, e.g., id. at 854-56 (discussing puts); infra section II.A (discussing calls and puts).

\footnote{15} Existing work has focused both on the information that is generated through the exercise (or nonexercise) of options, see Kaplow & Shavell, supra note 8, at 725, and on information generated through the bargaining that occurs in the shadow of that threatened exercise or nonexercise, see Ayres & Talley, supra note 1, at 1038-39. See also infra section I.A.2 (discussing the information-forcing characteristics of liability rules). The exercise of real options also has the potential to reveal private information other than valuations. See, e.g., Steven R. Grenadier, Information Revelation Through Option Exercise, in GAME CHOICES: THE INTERSECTION OF REAL OPTIONS AND GAME THEORY 125 (Steven Grenadier ed., 2000). For example, if A observes B exercising an option nearby (such as drilling a well at a particular time or commencing land development), A may view that action as a signal revealing B's private information about the optimal time to drill or build in the area. See id. at 126-27.

A solution to this dilemma is suggested by work recasting liability rules as call and put options. Work to date has focused on the parties as option takers or takees. But parties could also be option makers — that is, they could be required to set the exercise prices to which others (or their future selves) will respond. This Article shows how entitlements could be restructured to exploit the revealing potential of such option-making arrangements. To be sure, scholars have already manipulated Calabresi and Melamed’s original four-rule schema into a profusion of possible entitlement regimes, and ongoing work on entitlements ensures a continuing stream of ever more complex permutations and combinations. But as the study of entitlements has become increasingly complex and formal, one intuitive possibility has been oddly neglected — the possibility that an entitlement holder could be given more control over the terms of transfer than she receives under an ordinary liability rule, but less control than she is afforded under a property rule.

Option making offers a middle ground between property rules and liability rules. When an entitlement is protected by a property rule,
the seller has absolute control over the exchange, in the form of a veto power. When a liability rule is involved, scholars have assumed that a court or other third party will set the exercise price. This arrangement leaves the entitlement holder with no control over the terms of the transfer. Between these two poles of absolute control and complete lack of control is the possibility that an entitlement holder could set the applicable exercise price within a liability-rule regime. We know from the literature on self-assessed valuations that it is possible to build in constraints that will elicit reasonably honest valuation statements. We also know from the literature on options (both financial and real) that granting an option is valuably different from simply announcing a price.

This Article explicitly combines these ideas to suggest a new entitlement regime: entitlements subject to self-made options (ESSMOs). The ESSMO offers an elegant alternative to property rules and ord-

“mixed” remedies that can result from “intermediate” entitlements, such as an injunction that limits but does not prohibit output).

22 See Calabresi & Melamed, supra note 8, at 1092 (explaining that a property rule “lets each of the parties say how much the entitlement is worth to him, and gives the seller a veto if the buyer does not offer enough”).

23 See, e.g., id. (explaining that a liability rule allows for the transfer or destruction of an entitlement “on the basis of a value determined by some organ of the state rather than by the parties themselves”); A. Mitchell Polinsky, On the Choice Between Property Rules and Liability Rules, 18 ECON. INQUIRY 233, 233 (1980) (“What distinguishes the liability rule is that the amount of compensation is determined by the collective authority, rather than by negotiation between the parties.”). Scholars typically suppose that the third-party decisionmaker’s job in setting or applying a liability rule is to approximate, as nearly as possible, the damage to the injured party. See, e.g., STEVEN SHAVELL, ECONOMIC ANALYSIS OF ACCIDENT LAW 127 (1987) (acknowledging the implicit assumption “that if liable parties pay for the actual level of losses they cause, they will be led to act optimally under liability rules”); Kaplow & Shavell, supra note 8, at 723 (assuming that, under a liability rule, the injurer “must compensate the victim for the harm, or the court’s best estimate of it” (footnote omitted)). But see, e.g., Ayres & Talley, supra note 1, at 1065–72 (discussing disadvantages of “tailored” liability rules in inducing bargaining); Levmore, supra note 20, at 2156–57 (discussing restitutionary variations that peg the award to the liable party’s unjust gain).

24 Some recent work has begun to suggest this possibility. See, e.g., Ian Ayres & J.M. Balkin, Legal Entitlements as Auctions: Property Rules, Liability Rules, and Beyond, 106 YALE L.J. 703, 743–44 (1996) (describing a “sealed bid” procedure that would make use of the parties’ valuations in determining damages); Knyst, Goldbart & Ayres, supra note 6, at 3 (describing a mechanism that contemplates submission of valuations by the two parties, an award of the entitlement to the higher valuer, and selection of damages from a curve based on their two reports).


26 See infra section I.A.1 (discussing real options literature and exploring the differences between transfers and prices). An option can also be distinguished from a typical offer. See infra note 48 (explaining that an offer can generally be retracted before acceptance, while an option formally eliminates the possibility of retraction for the duration of the option period).

27 Cf. Rose, supra note 7, at 2179 (observing that a liability rule creates a “property right subject to an option (or easement)” — that is, a “PRSTO (or PRSTE)”.

nary liability rules. It works by requiring a party to package her true subjective valuation in the form of an option — in other words, she must formulate a “revealing option.” By forcing the revelation of private information from one party and allowing the other party to unilaterally act on it, the ESSMO neatly dodges the twin risks of holdout problems and undercompensated transfers.\(^\text{28}\) It harnesses information more simply and accurately than an ordinary liability rule. It also avoids the need for the sorts of pervasive state involvement typical of liability rules.\(^\text{29}\) Moreover, it has the potential to work flexibly in multi-party settings that unfold in unpredictable ways over time.

The central insight underlying the ESSMO is not new. Option making grows out of a simple but powerful intuition found in a broader literature on self-assessed valuation mechanisms.\(^\text{30}\) Option making also has obvious antecedents in work on entitlement protection rules.\(^\text{31}\) However, little has been done to explore the potential of option making for law. By explicitly formulating the ESSMO, this Article begins the process of drawing out, connecting, developing, and applying a largely neglected set of ideas. While a great deal more work is required to determine precisely how and in what contexts a workable version of the ESSMO might be developed, this Article suggests some possible avenues for future research.

To see how option making would work in the factory/homeowner example, consider the following two-part entitlement scheme, which we might think of as a “customized callable call.”\(^\text{32}\) First, the home-
owner is granted an entitlement over the air quality, which is protected by a liability rule. Thus, the factory holds a call option that allows it to continue polluting upon payment of a periodic minimum damages amount set by a court or other third party. So far, this looks like a standard incarnation of Rule 2 in the Calabresi and Melamed framework.\(^3\)

But there is a twist. If the factory chooses to exercise its call option to pollute and pay, it must also give the homeowner a call option to "retake" the entitlement at an exercise price established by the factory. Hence, the factory chooses the exercise price of the homeowner’s call option, and this specification has two implications. First, it determines the price at which the homeowner may retake the entitlement; thus, the factory will want to keep the price high enough to deter an inefficient retaking. Second, the schema incorporates an additional tax mechanism that is keyed to the level at which the factory sets the exercise price. This feature deters the factory from setting the price higher than its true valuation of the entitlement.\(^4\) In other words, the factory’s original call option (the opportunity to pollute and pay) is made "callable" by the homeowners, but the factory customizes the price at which this "call back" option may be exercised. This customized option harnesses valuation information in a manner designed to ensure that the entitlement ends up in the hands of the higher-valuing party.\(^5\)

or other third party, but by the very party exercising the initial call option. See infra section II.D.2 (describing the customized callable call in detail). The idea of customizing damages based on self-assessed valuations has begun to crop up in work on property entitlements. See infra section I.C.2. It has perhaps been most clearly captured in scholarship addressing contract remedies. See, e.g., Robert E. Scott & George G. Triantis, Embedded Options and the Case Against Compensation in Contract Law, 104 COLUM. L. REV. 1428 (2004) (casting liquidated damages as options that parties should be free to price themselves); see also Ayres & Balkin, supra note 24, at 746–47 (discussing the possibility that the nonbreaching party could reprice damages by offering to pay an additional amount for performance).

\(^3\) Calabresi & Melamed, supra note 8, at 1116.

\(^4\) Within the bounds suggested, a variety of other factors will affect how the factory chooses the exact exercise price for the option it writes for the homeowner, including the factory owner’s information about the reservation price of the homeowner, his level of risk aversion, and the relationship that the mechanism establishes between the exercise price and the tax that must be paid. These factors will affect the way in which the surplus associated with any ensuing transfer will be divided between the parties. See infra section II.D.3.

\(^5\) Although the mechanism creates strong pressures in the direction of efficiency, it cannot guarantee efficient results in every instance. The valuation-eliciting mechanism provides some room for strategic action when parties have information about each other’s valuations. If the information is reliable, then the resulting strategic acts only affect the division of the surplus between the parties. If a party attempting to behave strategically has guessed wrong about the other party’s valuation, however, the possibility of inefficiency remains. Nevertheless, self-assessment provides a better check on this sort of inefficiency than does an ordinary property rule by structuring the moves to prevent mutual bluffing and by placing the risk of loss on the party making the valuation. See infra section II.D.3.
While this two-party scenario provides a quick sketch of what I mean by option making, the real payoff of this approach comes not in the static two-party case, but in the "commons" problems that led me to this topic at the outset. Even the most sophisticated market-mimicking devices cannot elicit the sorts of valuation information necessary to sustain efficiency in complex, dynamic settings. The problem of "hot spots" in environmental law is illustrative. Environmental harms often depend on the spatial and temporal configuration of pollution, rather than merely on the absolute amount of pollution. Judgments about the harms caused by particular quantities and concentrations are constantly undergoing revision. It is impossible to make efficient choices about whose entitlements should be curtailed as events unfold without knowing the relative values placed on those entitlements by the various parties holding them. Option making offers an underexplored way to tap into private valuations in multi-party interactions occurring over time and across space.

Although my case for ESSMOs rests on efficiency grounds, this entitlement form has potential advantages on distributive grounds as well. ESSMOs walk the line between protecting subjective values in currently held entitlements and facilitating efficient transfers. Like other liability rules, the self-made option arrangement keeps parties from wrangling to impasse over the surplus by establishing in advance, through choosing protocols, how the surplus will be divided. The distribution of the surplus can be shaped by deciding who begins with the entitlement and by manipulating other design features. The fact that an ESSMO ameliorates the risk of undercompensation by giving control over the transfer price to the option writer may be deemed attractive in many settings on distributive grounds.

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36 In two recent articles, I have examined these kinds of problems in some detail. See Fennell, supra note 5 (discussing commons and anticommons problems); Lee Anne Fennell, Contracting Communities, 2004 U. ILL. L. REV. 829 (examining problems of aesthetic control within private developments).

37 See infra notes 270–272 and accompanying text (discussing "hot spots").

38 See infra notes 270–271 and accompanying text.

39 See infra note 267 and accompanying text.

40 To be sure, idiosyncratic valuations might not always be deemed normatively worthy of protection. See, e.g., Ian Ayres, Protecting Property with Puts, 32 VAL. U. L. REV. 793, 810 (1998) (noting that it is unclear whether higher valuations generated by the endowment effect should be privileged); Fennell, supra note 5, at 931–32 (noting the possibility of a distributive objection to someone who refuses to sell because of an abnormally high subjective valuation). Option making, however, would seem to address a primary practical objection to recognizing high subjective valuations— the risk of "fraudulent" claims and the costs required to screen them out. See Ellickson, supra note 12, at 736 (discussing these costs and risks). Ellickson also mentions the possibility that idiosyncratically high valuations may represent a kind of costly hypersensitivity that the holder of such valuations is in the best position to address. Id. Insofar as an option-making device makes holding a high subjective valuation costly, it would help to address this concern as well. See Levmore, supra note 25, at 781 (observing that under a self-assessed property tax valua-
This Article makes three contributions. First, it exposes and suggests a way of filling a logical gap between property rules and liability rules. Both the gap itself and the potential associated with filling it emerge from my examination of unarticulated connections among the literatures on entitlement protection devices, commons problems, self-assessed valuation mechanisms, and real options. Tracing these connections requires exploring, in very intuitive terms, the problem of subjective valuation and the mechanisms capable of addressing it. Part I begins laying the groundwork by explaining how options elicit truthful valuations. To produce honest valuations, a mechanism must veil the individual from the knowledge of whether a too-high or too-low valuation would be more advantageous to her. In other words, deviations from one's actual subjective valuation in either direction must cost the individual something in expected value terms. Building on the literature on self-assessed valuations, I consider how revealing options can be made to perform this veiling function.

Second, the Article offers a detailed analysis of how revealing options could operate to control aesthetic spillovers in a private neighborhood setting. An extended example in Part II shows how a specific sort of ESSMO — the “customized callable call” — could accomplish efficient spillover control, even under conditions of substantial heterogeneity and ongoing change. This example shows how work on self-assessed valuations and entitlements translates into the commons setting, where features like reciprocal interactions and repeat play are present. The surprising conclusion of Part II is that option making can represent a viable alternative to relying on sorting to produce and maintain homogeneity in preferences within a community.

Third, the Article demonstrates, through a number of examples presented in Part III, how the key intuitions underlying ESSMOs can be applied to a variety of other legal problems. For example, I show how option making could foster innovation in environmental controls by permitting more nuanced responses to evolving conditions and spatial and temporal nonfungibilities. Likewise, option making provides a possible alternative to conservation easements — one that can better interject flexibility into the interactions between current and future holders of land. Revealing options can also be employed to manage intra-institutional and even intra-personal temporal dilemmas in settings where future preferences may differ or new information may be-
come available. For example, the idea that smokers could voluntarily choose a cigarette tax as a precommitment device can be recast in terms of offering options to future selves. Similarly, an institution could use option making to communicate the strength of present preferences to future versions of itself.

I. TRUTH WITH CONSEQUENCES

The primary stumbling block to obtaining a truthful valuation statement is a party's knowledge of the way the valuation will affect her fortunes. Conversely, truthful valuations can be elicited by engineering conditions so that a party does not know whether a high or low valuation will be to her advantage. Producing this state of information-forcing ambivalence requires attaching consequences to valuation misstatements in both directions. Legal arrangements that mandate option making represent an underappreciated way to offset the consequences of a too-high valuation against the consequences of a too-low valuation. In this Part, I discuss the conditions under which option making can serve this function. In so doing, I locate this project within three bodies of scholarship — that on real options, on property rules and liability rules, and on self-assessed valuation devices.

A. The Value of Options

1. Prices Versus Options. — As a first step, it is necessary to lay out the ways in which options differ from ordinary prices. Parties whose entitlements enjoy property rule protection are free to set their own prices for those entitlements. In ordinary discourse, we might say that someone who sets a particular asking price gives potential buyers the option (in the colloquial sense of having a choice) to obtain the entitlement at that price. For example, if I put my house on the market for $200,000, a house-hunter might think that she has the option of buying my house at that price. But an asking price is not an option in the formal sense. I can change my price at any time, and the chance

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46 See infra section III.B.1.

47 See infra section III.B.2.

48 See, e.g., Mark Klock, Financial Options, Real Options, and Legal Options: Opting To Exploit Ourselves and What We Can Do About It, 55 ALA. L. REV. 63, 65 n.17 (2003) (defining "options" as "valuable choices" in which "the value comes from the ability to defer making the choice until after seeing the future"). While offers can become irrevocable under certain circumstances, they usually can be retracted at any time prior to acceptance. See, e.g., Omri Ben-Shahar, Contracts Without Consent: Exploring a New Basis for Contractual Liability, 152 U. PA. L. REV.
to buy my house at the advertised price can be extinguished by the acts of third parties — someone else could come along and buy my house first. The house-hunter who sees my real estate ad has paid nothing for an option and holds no cognizable entitlement to obtain my house at that price.

Contrast this situation with the one created by the standard real estate contract used in Texas, which contains a formal option clause. The buyer pays a small amount (typically one or two hundred dollars) for an option period (typically seven to ten days) during which she may walk away for any reason or no reason, with all earnest money refunded on the contract; she loses only the option fee itself. Consider how the option contract changes things from the state of the world that existed when the home was merely advertised at a given price. By purchasing the option, the buyer has something he did not have before — the right to purchase the house at a given price, under given terms. This right requires that the option be irrevocable (or at least costly to revoke) during the option period. In other words, the option projects the right to purchase at a given price and under given terms forward in time.

A corollary is that option creation takes place under conditions of greater ignorance than does option exercise (or nonexercise). The option operates in a unilateral fashion to grant the option-holder (here, the potential buyer) all of the advantages associated with moving from a position of relative ignorance to one of relative knowledge. It shields the buyer from any downside risk associated with new information or developments during the option period, while locking in his ability to glean any upside gains. This situation can be readily contrasted with

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1829, 1830, 1833 & n.7 (2004) (noting the general rule and the existence of some exceptions to it); Avery Wiener Katz, The Option Element in Contracting, 90 VA. L. REV. 2187, 2194–95 (2004) (discussing “firm offers” permissible under UCC § 2-205). Options, on the other hand, derive all their value from the transformation of a particular opportunity into one that is irrevocable during the option period.

49 See TEX. REAL ESTATE COMM’N, ONE TO FOUR FAMILY RESIDENTIAL CONTRACT (RESALE), TREC No. 20-6, ¶ 23 (Jan. 6, 2003), available at http://www.trec.state.tx.us/pdf/contracts/20-6.pdf.

50 See, e.g., RICHARD A. BREALEY & STEWART C. MYERS, PRINCIPLES OF CORPORATE FINANCE 564–68 & figs. 20.1, 20.2 (7th ed. 2003) (discussing and illustrating this point); Klock, supra note 48, at 75 (“The fundamental attribute creating value in an option position is the presence of risk where losses are truncated and gains are not.”). As a result, options are more valuable under conditions of greater volatility. See, e.g., BREALEY & MYERS, supra, at 579–81 & fig. 20.11 (explaining and illustrating how greater volatility increases option value); see also Eric Rasmusen, When Does Extra Risk Strictly Increase an Option’s Value? (Sept. 2, 2004) (unpublished manuscript, on file with the Harvard Law School Library) (discussing the conditions under which increased variance increases the value of an option), available at http://www.rasmusen.org/papers/options_rasmusen.pdf. Likewise, options with longer terms are more valuable, other things equal. See, e.g., BREALEY & MYERS, supra, at 565 (noting that “the option price increases as option maturity is extended”); Katz, supra note 48, at 2207–10 & n.54 (observing that the longer
the precontract state, where both parties are exposed to risks about developments in the real estate market or unfolding information about the property in question. As Lenos Trigeorgis explains, "The beneficial asymmetry deriving from the right to exercise an option only if it is in the option holder's interest to do so — with no obligation to do so if it is not — lies at the heart of an option's value." To put it another way, the seller begins with an entitlement to the house that is protected by a property rule, and the option contract effects a downgrade of her entitlement protection to liability rule status vis-à-vis the option holder, for the duration of the option period.

In this simple purchase option example, the option is priced separately — an explicit clause in the contract sets out how much the option costs and what it entitles the option holder to do. The price reflects the value forgone by the seller in moving from the precontract world to the option contract state of the world. But options are often "embedded" in other entitlements and may not be articulated explicitly. Indeed, options may be entirely unwritten and implicit, as the literature on real options illustrates. Legal scholars are beginning to pay attention to the way in which the structuring of legal entitlements creates embedded real options. For example, recent work has elabo-

term is advantageous not only for discounting reasons, but also because there is more time for variance to occur that will put the option "in the money").

52 See Tex. Real Estate Comm'n, supra note 49, ¶ 23.
53 See, e.g., Katz, supra note 48, at 2188–89 (noting the option-like structure of damages in contract law and observing that "contracts that are nominally structured as explicit options can be close economic substitutes for contracts that are nominally structured as unconditional"); Klock, supra note 48, at 65 (noting that many embedded options exist in the law); Scott & Triantis, supra note 32, at 1456 (characterizing contract termination provisions as embedded options).
54 For example, a developer who owns a tract of land might be viewed as also holding an option to develop it at the exercise price of the cost of construction. See, e.g., Grenadier, supra note 15, at 126; Laura Quigg, Optimal Land Development, in Real Options in Capital Investment: Models, Strategies, and Applications 265 (Lenos Trigeorgis ed., 1995).

The real-options literature has primarily focused on the value of options for private businesses, but individuals, communities, and public bodies can also benefit from the flexibility associated with options. See, e.g., Avinash K. Dixit & Robert S. Pindyck, Investment Under Uncertainty 23–25 (1994) (suggesting some ways in which options analysis might be extended to personal and social choices); Burton A. Weisbrod, Collective-Consumption Services of Individual-Consumption Goods, 78 Q. J. Econ. 471, 472–73 (1964) (developing the idea that the value of a good such as a public park includes the "option value" it confers on those who might later consume it).

55 See, e.g., Ian Ayres, Optional Law (forthcoming 2005) (manuscript at 3–6, on file with the Harvard Law School Library) (explaining how "law creates options" in a variety of contexts); Peter H. Huang, Corporate Finance: Teaching Corporate Law From an Option Perspective, 34 GA. L. REV. 571, 593–96 & n.47 (2000) (discussing legal applications of options analysis and citing literature applying such analysis to legal problems); Klock, supra note 48 (discussing options in law).
rated, formalized, and extended the familiar idea that a contract enforceable only with damages incorporates an option. Similar connections have been drawn between entitlements and options in the literature on property rules and liability rules, as the next section discusses.

2. Liability Rules as Options. — It is obvious why an option holds value for the option holder: it provides flexibility over a period of time by offering upside potential without downside risk. But why might options also hold value for a legal system? Some of the advantages of options have already been explored in the literature on property rules and liability rules. When entitlements are protected by property rules, individuals can “stand on their rights” and refuse to engage in any transfer until they receive a price that satisfies them. Property rules thus fully accommodate idiosyncratically high subjective valuations and ensure that any transfers that do occur represent Pareto improvements. Yet an individual’s price demands may be sensitive not only to her own subjective valuation of the entitlement in question, but also to her strategic assessment of the would-be buyer’s subjective valuation of that entitlement. As each party holds out for a larger share of

School of Law in October 2004, for which this Article was drafted, offers one marker of the growth of this mode of analysis.

56 See, e.g., Katz, supra note 48, at 2188 (observing that “it has long been recognized that a contract that is enforceable only through monetary liability operates in practice as an option, because as a legal matter the promisor retains the power either to perform or to breach and pay damages”); Scott & Triantis, supra note 32, at 1429 n.1 (“It is well known that contract damages effectively give the promisor an option between performing the promise or breaching and paying damages.”). The option embedded in a contract enforceable only with damages can be framed in a variety of economically equivalent ways. See, e.g., Katz, supra note 48, at 2206 & n.47; Scott & Triantis, supra note 32, at 1456–57. Suppose a buyer orders one hundred widgets at one dollar, under a contract that assesses a twenty-percent fee in the event the buyer defaults. Here, the contract could be framed as giving the buyer a call option to walk away from the deal upon surrendering twenty dollars to the seller. Cf. Paul G. Mahoney, Contract Remedies and Options Pricing, 24 J. LEGAL STUD. 139, 140 (1995) (explaining that the availability of money damages against a promisor gives the promisor “an option to buy back his performance by paying an amount of money awarded by the court”). Alternatively, the buyer could be viewed as having bought the widgets for one hundred dollars, along with a put option that will allow her to “resell” the widgets to the seller at a price of eighty dollars. See Scott & Triantis, supra note 32, at 1456; see also Katz, supra note 48, at 2206 n.47. Finally, the deal could be framed as an implicit option contract in which the buyer pays twenty dollars to purchase an option to take delivery of the widgets at an exercise price of eighty dollars. See Scott & Triantis, supra note 32, at 1456–57; see also Katz, supra note 48, at 2226–27. Scott and Triantis suggest that it is preferable to frame the situation as an implicit option contract, because doing so allows the damages amount to be isolated as the option’s price, with the balance of the price serving as the exercise price; under other formulations the option price is embedded within the contract’s other terms. Scott & Triantis, supra note 32, at 1457.

57 See, e.g., Ellickson, supra note 12, at 736 n.192; Smith, supra note 12, at 1785.

58 This assumes that parties can reliably assess what makes them “better off,” which may not always be the case. See, e.g., Daphna Lewinsohn-Zamir, The Objectivity of Well-Being and the Objectives of Property Law, 78 N.Y.U. L. REV. 1669 (2003) (critiquing the equation of preference satisfaction with welfare).
the surplus, a bargaining impasse may result — even in circumstances where both parties would be better off reaching agreement.⁵⁹ Property rule protection therefore risks blocking efficient transfers, even as it protects against inefficient transfers through solicitude for individuals’ reservation prices.⁶⁰

Liability rules overcome the holdout problem by allowing unilateral transfers upon payment of damages.⁶¹ Traditional liability rules amount to call options held by the party who is not initially assigned the entitlement.⁶² That party can either do without the entitlement or pay the specified “exercise price” (damages) to obtain it. For example, a factory could be given a call option that allows it to pollute if it pays damages to nearby residents.⁶³ Conversely, put options allow the party initially assigned an entitlement to force its sale to the other party at an established exercise price.⁶⁴ For example, the factory could have a right to continue polluting as well as the option to collect a subsidy if it stops polluting.⁶⁵

Both sorts of liability rules⁶⁶ economize on information by inducing one party to demonstrate whether she values a particular entitlement

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⁵⁹ This can be modeled as a “Chicken” game, in which each party attempts to capture a disproportionate share of the available surplus, even though each would be better off accepting a smaller share rather than walking away from the deal. See Fennell, supra note 5, at 946-52 (discussing this model and citing literature that connects the Chicken game to the holdout problem).

⁶⁰ An analogy can be drawn here to the tradeoff between Type I and Type II errors (false positives and false negatives, respectively). See, e.g., Richard H. McAdams, Race and Selective Prosecution: Discovering the Pitfalls of Armstrong, 73 CHI.-KENT L. REV. 605, 613-14 & n.46 (1998) (defining Type I and Type II errors and discussing the tradeoffs between them). It is possible to structure entitlements so that all non-Pareto-improving moves are screened out, but only at the price of screening out some Pareto-improving moves.

⁶¹ See, e.g., LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD 203, 260, 332 n.26 (2001) (discussing the use of damage remedies in patent law to avoid holdouts, and providing citations to literature on this point); Reza Dibadj, Regulatory Givings and the Anticommons, 64 OHIO ST. L.J. 1041, 1113-15 (2003) (discussing the potential of liability rules to preclude anticommons problems); Levinsohn-Zamir, supra note 8, at 226 (explaining that liability rules “remove the owner’s holdout power”).

⁶² See, e.g., Ayres & Taïley, supra note 1, at 1041; Morris, supra note 8, at 852–54; Rose, supra note 7, at 2179. But see id. at 2181-82 (suggesting that the “option” metaphor breaks down in contexts where specificity and advance planning are absent).

⁶³ Conversely, the residents might be given a call option that allows them to stop the pollution upon paying the costs that this restriction will inflict on the factory. See Calabresi & Melamed, supra note 8, at 1116-17 (discussing Rule 4); see also Spur Industries v. Del E. Webb, 494 P.2d 700 (Ariz. 1972) (applying a remedy that resembles Rule 4).

⁶⁴ See, e.g., Ayres, supra note 40, at 796; Morris, supra note 8, at 854–56.

⁶⁵ Conversely, the residents might have both the right to clean air and the option of requiring the factory to pay for its pollution. See Pile v. Pedrick, 31 A. 646 (Pa. 1895) (offering a plaintiff the choice between requiring that a wall built over the property line be removed or collecting damages for the intrusion); see also Ayres, supra note 40, at 815–16 (discussing this example).

⁶⁶ Both call and put options can be classified as liability rules, in that they both allow unilateral transfers. See Ayres & Goldbart, supra note 8, at 6.
more or less than the applicable exercise price. A party who exercises a call option demonstrates that the call is "in the money" for her—that is, her private valuation of the entitlement exceeds the exercise price. Likewise, when an entitlement holder exercises a put option, she demonstrates that the entitlement’s value to her is less than the exercise price. If the exercise price is set to match the other party’s valuation, the outcome will be efficient. In addition, the possibility that a call option might be exercised (or might not be exercised) can prompt informative bargaining moves from the entitlement holder. Adding successive rounds of liability rules can help to force information from both parties. Hence, parties’ responses to options tend to push private valuations out into the open and encourage efficient outcomes.

Notwithstanding these advantages, the options embodied in ordinary liability rules suffer from a serious drawback: their exercise prices are determined by a governmental actor who has less information about the parties’ valuations than the parties have themselves. As a result, ordinary liability rules resemble a form of centralized planning. Because information is imperfect, exercise prices may be set too high or too low relative to the valuation of a particular entitlement holder, with resulting efficiency losses. These shortcomings become especially acute over time as fluctuations in conditions interact with changes in the valuations of multiple parties. One response to these informational difficulties is to shun liability rules in favor of property rules. But there is another alternative. The ESSMO entitlement form would retain the crucial advantage of liability rules—the capacity for unilateral transfer—while allowing entitlement holders themselves to set the exercise prices.

67 See, e.g., Ian Ayres & Paul M. Goldbart, Correlated Values in the Theory of Property and Liability Rules, 32 J. LEGAL STUD. 121, 121-24 (2003); Kaplow & Shavell, supra note 8, at 725.

68 See Kaplow & Shavell, supra note 8, at 725 (noting that a liability rule can harness private information about prevention costs, because it prompts the injurer to make a choice based on whether her prevention cost is higher or lower than the damage amount); id. n.37 (noting that an analogous argument applies in the case of the "reverse liability rule" which requires victims to choose between putting up with the injury or paying the injurer to stop); see also Ayres & Goldbart, supra note 67, at 121-24 (discussing the information-harnessing advantages of liability rules).

69 See Ayres, supra note 40, at 803-04 (discussing the capacity of put options, like traditional liability rules, to harness private information).

70 See, e.g., SHAVELL, supra note 23, at 127-28.

71 See Ayres & Talley, supra note 1, at 1038-39.

72 See generally Ayres & Balkin, supra note 24.

73 See Smith, supra note 12, at 1778-79 & n.204 (discussing the analogy to centralized planning drawn in Ayres & Goldbart, supra note 8, at 10).

74 See id. at 1778.

75 See id. at 1783-85 (discussing the circumstances in which property rules dominate liability rules on information-cost grounds).
By employing a model in which exercise prices are set by third parties, the literature on liability rules has largely overlooked two advantages of options that the ESSMO entitlement form spotlights. First, options open up the possibility of customized pricing based on personal valuations. The pricing of options in the financial marketplace is under private control. Recharacterizing liability rules as options leads naturally to the thought that private parties could likewise choose the prices for options to transfer legal entitlements. Such an option-making process offers a mechanism for smoking out true subjective valuations. In so doing, it can help to overcome the central drawback of liability rules: their potential imprecision in capturing valuations of harm and the associated administrative costs that governmental bodies face in attempting to approximate those valuations.\footnote{If the exercise price for a call option is set too low, inefficient transfers can occur; if the exercise price is set too high, efficient transfers may be blocked. Likewise, if the exercise price for a put option is set too high, inefficient transfers can occur; if set too low, efficient transfers might be blocked. Even if imprecise liability rules can outperform property rules, see, e.g., Kaplow & Shavell, supra note 8, at 728-32, more precise liability rules would perform even better. Moreover, any advantages "untailored" rules may hold for inducing better bargaining, see Ayres & Talley, supra note 1, at 1065-72, do not translate to settings where bargaining is unavailable or does not, as an empirical matter, tend to occur. See Ward Farnsworth, Do Parties to Nuisance Cases Bargain After Judgment? A Glimpse Inside the Cathedral, 66 U. CHI. L. REV. 373, 381-84 (1999) (finding that in none of the twenty nuisance cases he analyzed did the parties engage in entitlement trades after judgment, nor did any of the lawyers involved in those cases believe that such bargaining would have occurred if the cases had been decided differently).}

Second, options project decisionmaking forward in time and reallocate the risk of future developments. They provide the option holder with valuable flexibility to obtain upside gains without downside risk, while simultaneously reducing the flexibility of the option writer during the option period.\footnote{See supra notes 50-51 and accompanying text.} All liability rules share this advantage, but ordinary liability rules feature externally determined exercise prices that suppress the impact of unfolding events on valuations. With ESSMOS, however, the option maker can use all of the information available to her about the likely course of future events and their impact on her personal valuation to select an appropriate, customized exercise price for the option period. In turn, the option holder can monitor events over the option period and exercise the option if it becomes valuable to do so. Thinking about options in this light focuses attention on important design choices, such as the length of the option period — and hence the opportunities that the option maker will have to "update" her valuation — and the question of which party should write the option and which should hold the option.

Consider, for example, a setting in which multiple parties write options for a collective decisionmaker, such as a government body. If the amount of harm caused by a particular activity depends on the inter-
action of multiple factors over time, the ability of the public entity to monitor the situation and respond appropriately to unfolding events is very valuable. While governments can always engage in a regulatory response to changes, options offer an intriguing way to guide governmental decisionmaking along more efficient paths. If each option maker selects an exercise price based on her expectations about the course of her individual valuation over the relevant time period, the public body can readily survey the territory to select which options to exercise during that time period.

As the analysis here will demonstrate, these two advantages of options work in tandem: the flexibility that the option provides to the option holder transforms option making into a valuation-revealing enterprise for the option maker. Before turning to legal applications, it is first necessary to work through two other building blocks of the analysis: the role of "veiling" mechanisms in eliciting honest valuations, and the significance of required option making for this veiling function.

B. Veiled Valuations

As John Rawls famously explored, the distorting effect of self-interest could be neutralized if people could be placed behind a "veil of ignorance" about what will ultimately be to their personal advantage. The power of veiling techniques to elicit more meaningful judgments has been explored in a variety of contexts. Of particular relevance here are mechanisms that exploit ignorance about the consequences of valuation to force honest valuation statements. I will in-

78 Cf. Victor P. Goldberg, Framing Contract Law: An Economic Perspective § 5.3 (forthcoming 2005) (manuscript at 32, 37–38, on file with the Harvard Law School Library) (explaining that the termination clause at issue in Wasserman v. Township of Middletown, 645 A.2d 100 (N.J. 1994), can be understood as an option that afforded the lessor flexibility to respond to changes that might occur over the thirty-year lease period).

79 See John Rawls, A Theory of Justice 136–42 (1971) (presenting a thought experiment in which individuals must choose principles without knowing what position each of them will ultimately occupy in society).

80 Some literature extends the Rawlsian thought experiment to new domains, see, e.g., Russell Korobkin, Determining Health Care Rights from Behind a Veil of Ignorance, 1998 U. Ill. L. Rev. 801, while other work examines actual veiling mechanisms embedded in legal rules, see, e.g., Adrian Vermeule, Veil of Ignorance Rules in Constitutional Law, 111 Yale L.J. 399 (2001).

introduce the interesting body of literature on such devices in this section. In section I.C, I explain how such mechanisms can be recast in terms of forced option making, and why doing so is worthwhile.

1. Valuing Without Veils. — To see how veiled valuations work to constrain strategic behavior, it is useful first to consider two other arrangements that cannot reliably elicit honest statements of value — ordinary bargaining and a “name your award” system. To illustrate this latter (and unrealistic) arrangement, suppose that your house has just been taken through eminent domain to make way for a highway, and that the government asks you to state the subjective value of your house for compensation purposes. While some people might state honest valuations under these circumstances, the fact that “shading” in one particular direction is both costless\(^8\) and unambiguously profitable would encourage significant overstatements of value.

In ordinary bargaining, it is also clear to the parties in which direction they should shade their valuations in order to maximize their surplus. Suppose one party (Aurora) owns a house and another party (Borealis) is interested in purchasing it. Aurora’s asking price tells Borealis only that Aurora’s true valuation is no higher than that number. Similarly, when Borealis makes an offer, Aurora learns only that Borealis’s valuation is at least as high as that number. As the parties work through rounds of offers and counteroffers, each can add verbiage to the proposed numbers (such as “this is my last and final offer!” or “that’s my rock bottom price, take it or leave it!”), but these statements may or may not be truthful. Unlike in the “name your award” case, there is some cost to lying about one’s valuation when bargaining — the expected loss arising from the chance that a mutually beneficial deal will fail to occur, or (less dramatically) from the dissipation of value that occurs in the course of wrangling.\(^8\) But because no party to the transaction fully internalizes the lost surplus associated with a costly or derailed deal, whereas each party will garner the full benefit of squeezing a little more surplus out of the deal, parties can still hit a bargaining impasse.\(^8\)

\(^8\) also been developed in the voting context. See, e.g., Tideman & Tullock, supra note 30 (presenting and extending literature on voting procedures designed to incorporate honest intensities of preference, including that of Edward Clarke and Theodore Groves); see also DONALD E. CAMPBELL, INCENTIVES: MOTIVATION AND THE ECONOMICS OF INFORMATION 283-98 (1995) (discussing the Groves-Clarke voting mechanism).

\(^8\) I am assuming that overstatements would be impossible to detect or prove. If this were not the case, then punishments could be directed at deterrence of overstatements, just as they can be used to deter crime. See Bell & Parchomovsky, supra note 81, at 300-06 (suggesting an auditing and penalty mechanism for constraining valuations in “derivative takings” cases).

\(^8\) See, e.g., Polinsky, Resolving Nuisance Disputes, supra note 8, at 1092 & n.37 (discussing the risk of bargaining breakdown as well as the costs associated with unnecessary bargaining).

\(^8\) As in the Chicken game, strategy is informed by the knowledge that a “crash” (mutual failure to “swerve” sufficiently to come to terms) will hurt the other party as well. See supra note 59.
In short, because the parties cannot tell how much surplus is available, they may squeeze too hard. Neither can tell whether the other is being greedy or is already at her reservation price. Significantly, this cloaking of true valuations not only leads each party to suspect that there may be more surplus yet to be claimed lurking in the other party’s valuation statement, but also enables each party to claim the moral high ground as she engages in further squeezing. When bargaining fails, private information is often a chief cause.

2. Payoff Uncertainty: Cutting and Choosing. — The key to eliciting an honest valuation statement is to attach negative consequences to both a too-high and a too-low valuation. This task can be accomplished by linking the act of valuation to the creation of a complementary payoff set, under conditions of uncertainty about which of the two resulting payoffs the value-stater will receive. Consider the familiar solution to dividing a cake: the child who divides the cake must take the last piece. The optimizing solution for the child in charge of slicing is to make the slices equal, thereby maximizing the size of each of the possible payoffs she may end up receiving. This equalize-the-

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85 Parties’ ability to cloak true valuations is likely to be psychologically significant. If the amount of surplus in question were obvious to everyone (consider a homogeneous pie that magically appears on a lunch table at which are seated three people with perfectly homogeneous pie preferences), the parties would be likely to agree on a three-way split. See Lewinsohn-Zamir, supra note 8, at 232 (suggesting, based on experimental evidence, that entitlement holders would typically be able to reach agreement about “division of the pie”). Given heterogeneous private valuations, as impacted by factors like the self-serving bias, see Babcock & Loewenstein, supra note 2, parties can maintain their rhetorical commitment to this sort of “fair split” while actually trying to obtain a larger share for themselves. See, e.g., Heller & Eisenberg, supra note 5, at 701 (suggesting that the tendency to overvalue one’s own assets and undervalue those of others may contribute to impasses in patent bargaining); Lewinsohn-Zamir, supra note 8, at 233 & n.46 (noting the relevance of cognitive phenomena and perceptions about entitlements to prospects for a fair split).

86 Specifically, private valuations fuel transaction costs associated with strategic bargaining and “holding out.” There are other kinds of transaction costs that are unrelated to such strategizing. See, e.g., Robert C. Ellickson, The Case for Coase and Against “Coaseanism”, 99 YALE L.J. 611, 615 (1989) (presenting a functional taxonomy of transaction costs that includes “get-together costs,” “decision and execution costs,” and “information costs”); Rose, supra note 7, at 2184 (defining a category of “Type I Transaction Costs” that can “result from having to find and assemble numerous or indistinctly defined interested parties”).

87 See, e.g., WILLIAM J. BAUMOL, SUPERFAIRNESS: APPLICATIONS AND THEORY 15–16 (1986) (describing solutions to cake-division problems); STEVEN J. BRAMS & ALAN D. TAYLOR, FAIR DIVISION: FROM CAKE-CUTTING TO DISPUTE RESOLUTION 8–29 (1996) (discussing cake-cutting and other cut-and-choose games); RAWLS, supra note 79, at 85 (describing a cake-division exercise in which the person cutting will receive the last slice); Ayres & Talley, supra note 1, at 1034, 1072 & n.133 (discussing cake-cutting examples).

88 This solution assumes, of course, that the item one is dealing with is perfectly divisible, rather than “lumpy.” See, e.g., BRAMS & TAYLOR, supra note 87, at 8 (noting the divisibility assumption); cf. Michael Taylor & Hugh Ward, CHICKENS, WHALES, AND LUMPY GOODS: ALTERNATIVE MODELS OF PUBLIC-GOODS PROVISION, 30 POL. STUD. 350 (1982) (discussing public goods such as bridges that exhibit discontinuities and “cannot be usefully provided in any amounts but only in
payoffs move is not merely a function of risk aversion. The odds of receiving a particular payoff are not stably set in advance but are instead affected by the slicing operation itself.89 A player who cuts the cake into equal parts has an equal chance of ending up with either of the two payoffs. But if she divides the cake to create one large hunk and one tiny sliver, her odds of receiving each of the two possible payoffs are no longer equal. Because she is the last chooser, she must assume that the other party will take the more valuable payoff.90 In other words, the less equal she makes the pieces, the less likely she is to benefit from that inequality.91

more or less massive ‘lumps’). For an extreme example of the impact of lumpiness on choices among payoffs, consider King Solomon’s threatened baby-splitting solution to a maternity dispute. Solomon’s threat did not elicit the two women’s relative valuations of an entitlement to keep the baby, but rather their views of the lumpiness of a baby, value-wise. For one woman, the baby carried positive value only when whole; splitting the baby represented for her a horrific, destructive act. For the other woman, half a baby was better than no baby (no doubt because it would keep her rival from having a whole baby). Solomon wisely concluded that a woman who derives no (positive) utility from half a baby would make a better parent than one who views a baby as divisible. Solomon’s judgment has been extensively analyzed. See, e.g., BRAMS & TAYLOR, supra note 87, at 6–7 & n.2 (discussing the judgment and citing additional work providing formal analyses); Brooks, supra note 1, at 282 & nn.62–64 (discussing the literature and providing analysis).

89 It is easy to see this point if we compare the “Child 1 cuts, Child 2 chooses” protocol with another in which Child 1 cuts the cake and distributions are later determined by a randomized spinner that will give each child one of the two slices. In the “spinner chooses” case, Child 1’s decision about how to slice up a fixed cake is entirely a function of her risk preferences. Both of these scenarios are distinguishable from one in which the act of slicing itself can affect the overall dimensions of the cake — the situation presented by the Rawlsian choice about the division of societal value. See infra note 91. The ESSMOs that I will discuss in this Article track the cut-and-choose protocol, although some applications of self-assessed valuations more closely resemble one of the other models. For example, Levmore discusses the potential for using pre-injury self-assessment measures, such as insurance purchases, to calculate tort damages. See Levmore, supra note 25, at 810–37. Under that system, the injurer does not choose whether to exercise this or that option based on knowledge of specific exercise prices. See id. at 843 (noting that in the tort damages context “no choice follows the revelation of tastes and preferences”). On the contrary, the self-assessor may have some ability to influence which of the payoffs she receives — this is the problem of moral hazard. See id. at 822; cf. Robert Cooter, Towards a Market in Unmatured Tort Claims, 75 VA. L. REV. 383, 393 (1989) (observing that “[d]ouble recovery schemes ... raise obvious moral hazards since recovery in excess of the amount required for perfect compensation transforms a reluctant victim into an eager one”).

90 This discussion assumes that both parties agree about what makes a portion of cake more or less valuable. If one party views a smaller portion of cake as more valuable, different slicing strategies might be expected. Additional strategies emerge when the cake is not homogeneous and the child slicing the cake has idiosyncratic tastes that she knows are not shared by the other player. See infra notes 93–96 and accompanying text.

91 This characteristic of the cut-and-choose game distinguishes it from the Rawlsian framework for social justice. Behind Rawls’s veil of ignorance, no person knows his eventual position in society; presumably, his assignment into a particular role will be random. A risk-neutral player would wish to maximize expected value, factoring in the chance of both high and low payoffs in an unequal scheme. Moreover, the Rawlsian “cake” in question is not of fixed size; it might be made larger through the introduction of some inequality in its slicing. Because Rawls’s maximin principle requires a single-minded focus on maximizing only the expected payoff of the least well-
While the cake-cutting approach is typically advanced on grounds of justice or fairness, it also reveals information about the divider's valuation of the assets being divided. When someone cuts a cake into two pieces, she reveals her valuation of the first slice expressed in the currency of the second slice, and vice versa. Of course, the valuation information revealed when a cake-maximizer slices up a homogeneous cake is rather obvious and uninteresting. But the ability to glean valuation information from observing what someone views as equivalent payoffs (that is, watching how someone "slices the cake") turns out to be very important when the items to be divided are heterogeneous.

For example, suppose that a large flower made out of icing is situated on one portion of the cake's surface. The player cutting the cake loves icing in the shape of flowers; to her, a quarter section with the icing flower is worth as much as the balance of the cake. To maximize the size of each possible payoff, she would divide the cake into one-quarter (with flower) and three-quarters (without flower). Her slicing behavior would thus reveal how much the icing flower was worth to her (measured in plain cake forgone).

To be sure, a potential for strategic behavior exists if the slicing party knows that the choosing party assigns negative value to icing flowers. If the slicing party were sure that the choosing party would act out of self-interest, she could simply make the slices equal, secure in the knowledge that she will end up with the portion containing the flower. Someone observing her slicing behavior could erroneously
conclude that she views the icing flower as a neutral factor, when in fact she views it as quite value-enhancing. In this way, strategic behavior can erode the revelatory content of acts of division.\textsuperscript{96}

There are significant constraints on such strategic behavior, however. If two parties know each other well enough for one to engage in such strategizing, the other is likely to be able to see through the stratagem. If $A$ knows that $B$ is taking advantage of known differences in subjective preferences, $A$ can elect to take a less desirable portion just to spite $B$.\textsuperscript{97} Realizing this, $B$ is less likely to act strategically. Conversely, as parties know less and less about each other, it becomes more difficult to predict which portion another will choose. Assuming a modest level of risk aversion, it becomes increasingly likely that a party will abandon strategic action and simply equalize the possible payoffs according to her true subjective valuations.

Before proceeding to other applications of this principle, it is helpful to disentangle two conceptually distinct goals that mechanisms is unclear. See, e.g., ELEANOR E. MACCOBY & ROBERT H. MNookIN, DIVIDING THE CHILD: SOCIAL AND LEGAL DILEMMAS OF CUSTODY 155–59 (1992) (presenting the results of a California study that did not support the hypothesis that fathers leverage larger settlements through disingenuous demands for custody and discussing possible explanations for those results, some of which relate to features of California law); Jeremy A. Matz, Note, We're All Winners: Game Theory, the Adjusted Winner Procedure and Property Division at Divorce, 66 BROOK. L. REV. 1339, 1354 & n.79 (2001) (discussing Maccoby and Mnookin's findings).

\textsuperscript{96} It is not clear whether strategic behavior also compromises fairness, as an example presented by William Baumol illustrates. Assume one-quarter of a cake is covered in chocolate and another quarter is covered in raisins. Further assume that one player views the chocolate quarter as the equivalent of the balance of the cake, and that the other player views the raisin-covered quarter of the cake as the equivalent of the balance. BAUMOL, supra note 87, at 66. Any division that gives each player their preferred quarter might be said to satisfy fairness conditions by giving each player what she views as half the value of the cake. \textit{Id.} Intuition might suggest that the surplus created by these heterogeneous preferences should be split by dividing the balance of the cake in half, but there is no particular reason to assume that one division of the surplus is more fair than another. \textit{Id.} But see H. PEYTON YOUNG, EQUITY: IN THEORY AND PRACTICE 135–36 (1994) (suggesting that a divide-and-choose allocation is acceptable only if it leaves both parties at least as well off as would an equal division of the items). In property entitlement contexts, background theories of property inform our intuitions about distributive fairness, and it is by no means clear that an equally divided surplus is fairer than some other arrangement in which one party or the other captures most of the surplus. See infra section II.D.3 (discussing distributive considerations). For the present analysis, the primary concern with strategic behavior resides in its capacity to mask true subjective valuations and impede efficient outcomes.

\textsuperscript{97} See BRAMS & TAYLOR, supra note 87, at 16–17 (discussing the role of spite in cut-and-choose games). For example, the child who loves icing flowers might attempt a strategic slicing against her brother, known to hate icing flowers. If her brother perceived what was going on, however, he might take the portion with the icing flower just to spite his sister, leaving her with a slice worth far less than half the value of the total cake. That parties are often willing to incur losses in order to punish those they believe have treated them unfairly can be readily seen in ultimatum game experiments. See, e.g., Christine Jolls et al., A Behavioral Approach to Law and Economics, in BEHAVIORAL LAW AND ECONOMICS 13, 21–26 (Cass R. Sunstein ed., 2000) (discussing empirical studies of ultimatum games that suggest people are willing to incur costs to punish perceived unfairness).
generating payoff uncertainty might advance: encouraging honest valuations and generating fair outcomes. As noted above, payoff uncertainty is often used to leverage self-interest into fairness. Just as "the life you save may be your own" in other contexts, protocols like the cut-and-choose game produce an awareness that "every payoff you devise may be your own."98 The pressures that such arrangements create in the direction of subjectively equivalent payoff sets generate a side effect, however, which here becomes the main attraction: one reveals what is for oneself the equivalent of a particular entitlement.

These revelatory effects underpin my case for entitlements that require option making. Structuring entitlements in this way has distributive effects as well, however, some of which I discuss below.99 For now, it is sufficient to emphasize that the revealing options proposed here do not produce the simple equality of an evenly divided cake. Indeed, they would not be useful for our purposes if that were their effect. We need to know private valuations precisely because the world is not made up of a homogeneous cake and homogeneously cake-preferring individuals; we wish to harness the efficiency gains that come from heterogeneity in subjective valuations.

3. From Cake Slicing to the Texas Shootout. — Consider how the same basic mechanism observed in the cake-cutting example — uncertainty about which payoff one will receive — can create pressures toward honest valuations in other settings. A party to a dispute over an entitlement (for instance, to graze cattle on a parcel of land) could be asked to name the dollar figure that the entitlement is worth to her. The other party to the dispute would then have an opportunity to choose between dollars and the entitlement, leaving the other payoff for the original party.100 A mechanism like this one works only when bargaining constraints make the first party's naming of a figure an irrevocable option for the other party. In addition, the choice made by the other party must be final and binding, with no opportunity for renegotiation. In other words, the bargaining interaction must be structured as a "take-it-or-leave-it" deal.101

98 This insight underlies the Rawlsian thought experiment suggested by the title of this section — a thought experiment aimed at generating just results, not efficient ones. See RAWLS, supra note 79, at 136-39 (describing the hypothetical "original position," which places parties behind a "veil of ignorance"); supra note 91 (discussing distinctions between the Rawlsian thought experiment and the cut-and-choose game).
99 See infra section II.D.3.
100 See Abramowicz, supra note 81, at 364-73 (presenting similar examples); infra note 126 (discussing the mechanics of one version of this game in more detail).
101 See Ayres & Talley, supra note 1, at 1049-50 (discussing the power associated with a take-it-or-leave-it deal).
Suppose the offering party \((O)\) is a rancher and the choosing party \((C)\) is a farmer.\(^{102}\) Two states of the world are placed before \(O\), one in which she has the entitlement to graze in a way damaging to \(C\)'s fields, and another in which she does not. \(O\) is asked to make a binding statement of the amount of money that would make her indifferent between those two states. Hence, \(O\) must do something very like cake cutting.

Figure 1 illustrates one way of framing \(O\)'s task. \(O\) is asked to create two sets of payoffs for herself and \(C\), which \(C\) will then be allowed to choose between. \(O\) does this by providing her valuation of the grazing entitlement, represented by \(x_o\) below.\(^{103}\)

**Figure 1**

<table>
<thead>
<tr>
<th>(O) Can Graze</th>
<th>(O) Cannot Graze</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C) Gets Nothing, Pays Nothing</td>
<td>(C) Pays (x_o) to (O) (value set by (O))</td>
</tr>
</tbody>
</table>

In selecting a value for \(x_o\), \(O\) has "sliced the cake," so to speak. She has revealed that the payoffs appearing in the two boxes are equivalent for her. Now \(C\) must make a binding choice between these two payoff sets. \(C\) can elect the left-hand payoff set and live without the entitlement; if he makes this choice, he does not receive anything from \(O\), nor does he pay her anything. If \(C\) chooses the right-hand payoff set, \(C\) gets the entitlement, but must pay \(O\) her valuation (\(x_o\)). In other words, these payoff sets extend a call option to \(C\) — he can obtain the grazing entitlement at the exercise price of \(x_o\).

A mathematically equivalent game would require \(O\) to give \(C\) a parallel but distinct set of choices. \(O\)'s valuation of \(x_o\) might instead be used to create the payoff sets shown in Figure 2.\(^{104}\)

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\(^{102}\) This is the standard Coasean example. See Coase, supra note 9, at 2–8. I will use it here for simplicity and familiarity, notwithstanding the literary license it may take regarding livestock issues. See ROBERT C. ELLICKSON, ORDER WITHOUT LAW 4 n.7 (1991) (observing that "Coase’s parable misidentifies the main risks associated with straying cattle" by focusing on damage to vegetation).

\(^{103}\) Her task can be more formally expressed as providing a value for \(x_o\) in the equation \(S_{1o} = S_{2o} + x_o\), where \(S_{1o}\) is her valuation of the state of the world in which she is allowed to graze (State 1) and \(S_{2o}\) is her valuation of the state of the world in which she is forbidden to graze (State 2).

\(^{104}\) Here, the payoffs are equalized not by adding \(x_o\) to State 2, as shown in supra note 103, but by subtracting \(x_o\) from State 1. In other words, \(O\)'s valuation completes the following equation: \(S_{1o} - x_o = S_{2o}\).
In this situation, C's two choices constitute a put option. C can either keep the grazing entitlement (that is, elect the right-hand payoff set) or force the sale of the entitlement to O at price $x_o$ (that is, elect the left-hand payoff set).

The key to both exercises is the option granted to C, who can unilaterally determine which of the two payoffs O will receive. In each of these two games, C's decision will turn on whether his own valuation of the entitlement, $x_C$, is higher or lower than O's valuation, $x_O$. Even though these two games appear to offer equivalent choices to the parties, the parties may not regard them as equivalent. To the extent there is a gap between willingness-to-pay (WTP) and willingness-to-accept (WTA), we would expect a higher valuation from an O who is playing the call option version of the game than from an O who is

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105 See, e.g., Abramowicz, supra note 81, at 365 ("With any self-assessment mechanism, after the valuation announcement is made, some other party makes a choice based on that announcement.").

106 If $x_C > x_O$, C will choose State 2, in which he holds the entitlement, whether he must pay off O in the amount of $x_C$ (as in the first equation, see supra note 103) or whether he must merely forgo a payment he could otherwise receive (as in the second equation, see supra note 104). If instead $x_C < x_O$, C will choose State 1, in which O gets the entitlement, whether this merely relieves him of a payment he would otherwise have to make (as in the first equation) or whether it affirmatively entitles him to compensation (as in the second equation). The possibility that the valuations C and O assign to entitlement x might change depending on which set of payoffs is involved will be addressed presently. See infra note 108 and accompanying text.

107 The willingness-to-accept/willingness-to-pay (WTA/WTP) gap refers to the difference between what someone is willing to pay for something that they do not yet own and what they would require in order to part with something that they already own. See, e.g., Elizabeth Hoffman & Matthew L. Spitzer, Willingness To Pay vs. Willingness To Accept: Legal and Economic Implications, 71 WASH. U. L.Q. 59 (1993). This gap has been associated in the literature with the endowment effect, loss aversion, and the status quo bias. See, e.g., id. at 85–96; Daniel Kahneman et al., Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias, J. ECON. PERSP., Winter 1991, at 193, 194. Explanations of this phenomenon focus on factors such as a psychological attachment to owned objects, the fact that financial losses from a given benchmark (as in making a purchase) tend to be more painful than forgone gains (from making a sale), and a general preference for maintaining the status quo that might be attributed to inertia or the desire to avoid regret over a bad decision. See, e.g., id.; Hoffman & Spitzer, supra, at 85–96. Moreover, a party may face liquidity or wealth constraints that keep her from paying as much for an entitlement as she would demand to surrender it. Recent empirical work has called into question the robustness of the WTA/WTP gap; while it is often observed experimentally, it has failed to appear in experiments carefully designed to eliminate subject misconceptions. See Charles R. Plott & Kathryn Zeiler, The Willingness To Pay/Willingness To Accept Gap, the “Endowment Effect,” Subject Misconceptions and Experimental Procedures for Eliciting Valuations, 94 AM. ECON. REV. (forthcoming 2005). Charles Plott and Kathryn Zeiler conclude from their findings that the gap cannot be explained as the product of an “endowment effect.” See id.
playing the put option version.\textsuperscript{108} Likewise, C’s honest valuation of the entitlement, \(x_c\), may vary depending on whether he has to pay to gain the grazing entitlement or merely to forgo payment. Because of these differences, the two cases could have different results even if O gave an entirely honest, unshaded valuation in both instances.

Moreover, either game will be less effective at eliciting true reservation prices than would a mechanism that leaves O uncertain whether she is potentially in the position of buying or selling an entitlement. Because O will still know whether her valuation creates a call option (which would place her in the potential role of seller) or a put option (which would place her in the potential role of buyer), she has an incentive to engage in “shading” of her valuation in an effort to capture more of the available surplus.\textsuperscript{109} For example, consider the strategy a customer might employ on Priceline.com, an online service that allows customers to make binding purchase offers (in other words, extend put options) to suppliers of items such as hotel rooms and airline tickets.\textsuperscript{110} If customers were to state their true reservation prices, they would merely receive a plane ticket or hotel room at the maximum price they would be willing to pay — hardly a bargain.\textsuperscript{111} Instead, customers would be expected to understate their reservation prices in the hope of reaping a surplus.\textsuperscript{112}

\textsuperscript{108} See, e.g., Ayres, supra note 40, at 899–12 (discussing possible differences in valuations between call and put options based on the bid-ask disparity); Jeffrey J. Rachlinski & Forest Jourden, Remedies and the Psychology of Ownership, 51 VAND. L. REV. 1541, 1551–59 (1998) (discussing the experimental literature on the endowment effect and its implications for Coasean analysis). \textit{But see} Ayres, supra note 40, at 811–12 & nn.55–56 (questioning whether an endowment effect would attach to the same degree to entitlements held subject to options); Rachlinski & Jourden, supra, at 1572–74 (presenting experimental results suggesting that the kind of remedy available may impact the endowment effect).

\textsuperscript{109} I do not mean to suggest that there is anything normatively blameworthy about these efforts. Requiring someone to reveal a reservation price and then making that price the basis for an entitlement transfer necessarily allocates all of the available surplus to the other party. Naturally, parties would prefer to capture at least some of the available surplus, and it may be normatively desirable for them to do so from the standpoint of distributive justice or ex ante incentives. \textit{See infra} section I.D.3. The concern about strategizing noted here relates only to the possibility that efficient bargains will be blocked as a result of valuation misstatements.

\textsuperscript{110} See Klaus Wertenbroch & Bernd Skiera, Measuring Consumers’ Willingness To Pay at the Point of Purchase, 39 J. MARKETING RES. 228, 239 (2002) (discussing Priceline.com as an example of a reverse auction, and explaining why it is not incentive compatible).

\textsuperscript{111} \textit{See id.} Significantly, many consumers can already obtain travel services well below their true reservation prices through ordinary market channels. Hence, those resorting to Priceline are primarily interested in whether they can reap a larger surplus through that avenue than through advertised prices.

\textsuperscript{112} \textit{See id.} (observing that Priceline customers “must bid less than their true WTP if they want to obtain surplus from the transaction”). Mechanisms for obtaining true reservation prices that eliminate this shortfall are frequently used in experimental settings. One of the best known is the Becker-DeGroot-Marschak (BDM) method, developed in Gordon M. Becker, Morris H. DeGroot & Jacob Marschak, Measuring Utility by a Single-Response Sequential Method, 9 BEHAV. SCI. 226 (1964). Under this procedure, a subject is asked to indicate the maximum price she is willing
Structuring a valuation game so that the offeror cannot follow up a rejected offer with additional proposals helps to constrain strategic pricing, but it will not always do so completely. A mechanism that leaves the valuer uncertain whether her valuation will give the other party a call or a put—that is, whether she will potentially be in the role of a buyer or seller at her stated price—provides a more powerful constraint on valuation. In addition to deterring intentional shading, it would dampen the impact of the WTA/WTP disparity—although not without some disadvantage to the party required to set the value. One way to generate this uncertainty is to attach both a to pay for an item. After the subject names a price, she will draw a ball from an urn to randomly determine the item’s actual transfer price. If the price she draws is lower than her stated price, she must purchase the item at the randomly drawn price. If the price she draws is higher than her stated price, she is not allowed to buy the item. See Wertenbroch & Skiera, supra note 10 (discussing and presenting experimental applications of the BDM method). The subject has an incentive to accurately state her valuation so as to be sure that she is able to engage in all those (and only those) transfers she views as worthwhile. The amount of surplus that she will receive as a result of a worthwhile transaction—one in which she gains the item at a price equal to or lower than her reservation price—is randomly determined by the draw from the urn and is not influenced by the valuation statement itself. See id. at 239 (discussing this point and explaining how it distinguishes the BDM method from the approach of Priceline); see also id. at 229–30 (describing the Vickery auction, which allows, for example, the top bidder in an auction to obtain an item at the price bid by the second-highest bidder).

Priceline gestures in this direction by limiting repeat customer requests within certain time frames. See Susan Stellin, Making Priceline Do Your Bidding, N.Y. TIMES, Oct. 24, 2004, § 5, at 4 (discussing these limits, which require that some detail of a repeated offer be varied in addition to the price). However, the website’s constraints on iterated offers are relatively weak. See id. (discussing pointers for working around the restrictions, as presented on BiddingForTravel.com, a site devoted to advising Priceline users).

See Ayres & Talley, supra note 1, at 1030 (noting the impact of this sort of “identity crisis” on statements during bargaining).

See supra notes 107–108 and accompanying text (discussing the WTA/WTP disparity). If the party required to provide an assessment does not know whether that assessment will be used to require her to purchase something or to sell something, and if her values for purposes of those two activities are different, she must state a value that mediates between the two. The other party, in contrast, gets to choose whether the price announced will be the basis for a forced purchase or a forced sale. See Levmore, supra note 25, at 839–42 (discussing this disadvantage to the first assessor in a self-assessed valuation system). It is of course possible to level the playing field by requiring both parties to make valuation choices without knowing whether a forced sale or a forced purchase will result. For example, Hervé Moulin explains that two siblings could “divide” an inherited painting by submitting sealed bids to an arbitrator. The high bidder would receive the painting but would have to pay half of her bid to the other party. Hervé Moulin, Cooperative Microeconomics: A Game-Theoretic Introduction 43 (1995).

The disadvantage to the first assessor could in some instances be counterbalanced by the advantage that the assessing party enjoys when she has knowledge about the preferences of the other party. This “first mover” or “divider’s” advantage is most clear in cases involving the division of heterogeneous goods. See Baumol, supra note 8, at 37–39 (discussing “[f]irst mover [a]dvantages” in the “classic” cut and choose problems, but noting that the advantage may be reversed when the first mover is ignorant of the other party’s preferences); Young, supra note 96, at 137–38 (discussing the “divider’s advantage” in division games in which the parties’ valuations are common knowledge); see also supra notes 90, 94–96 and accompanying text (discussing the possibility of strategic slicing behavior when the chooser’s preferences are known).
call and a put to the valuation statement. The so-called "Texas Shootout" approach to dissolving partnerships provides a very useful model for illustrating how this could be done. I will first describe this mechanism, and then return to our rancher/farmer example to show how the same principle might be applied to that setting.

The Texas Shootout leverages uncertainty about whether one will emerge as a buyer or seller of partnership shares into a truthful valuation statement. In a simple two-partner setting, the device would work as follows: One partner \((P_1)\) must name a price for her share of the partnership venture. The other partner \((P_2)\) can then choose to pay \(P_1\) that price to acquire \(P_1\)'s share of the venture, or can instead require \(P_1\) to buy out his \((P_2\)'s) share at that same price. Under this framework, when \(P_1\) sets a price, she is effectively making two valuation statements. First, she is indicating that she is indifferent between keeping her own half of the venture and receiving the stated amount of money. Second, she is indicating that she is indifferent between obtaining the other half of the venture at the stated price and keeping the stated amount of money. Because the two halves of the enterprise are by definition equivalent and fungible, these two representations are made simultaneously when \(P_1\) provides a valuation for her half of the venture.

The parties in a Texas Shootout are effectively playing both of the games outlined above simultaneously. We can think of them as playing the call option version of the game over \(P_1\)'s partnership share and the put option version over \(P_2\)'s partnership share. When we put these versions together, we can see that \(P_1\)'s valuation statement grants \(P_2\) the two sets of choices shown in Figure 3. First, \(P_2\) receives a call option on \(P_1\)'s share, which gives \(P_2\) a choice between the two

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116 See, e.g., Abramowicz, supra note 81, at 370-71 (discussing pairing calls with puts to elicit honest self-assessed valuations). Alternatively, one party's valuation statement could trigger a judge's choice as to whether the other party will receive a call option or a put option based on that valuation. See Levmore, supra note 20, at 2169-70 (noting the constraints on misstatements of value that would be provided by a system in which a judge could use a party's valuation either as the basis of a damage award to that party for harms suffered from the other party's operations or as the basis for a payment that the other party could collect if it chose to shut down its operations).


118 See Brooks & Spier, supra note 117, at 12-13 (describing how the Texas Shootout can induce the assessing partner to "tell the truth").

119 See id. at 2; Levmore, supra note 25, at 838-39.

120 This does not mean that \(P_1\) is necessarily indifferent between buying the other half and selling her own half. See supra note 115.
columns of Figure 3. \( P_2 \) can either leave \( P_I \)'s share alone or acquire it at \( P_I \)'s price. Second, \( P_2 \) receives a put option on his own share, which gives him (\( P_2 \)) a choice between the rows of Figure 3. \( P_2 \) can either keep his own share or force \( P_I \) to buy it at \( P_I \)'s stated price.

**Figure 3. The Texas Shootout**

<table>
<thead>
<tr>
<th>( P_2 ) Does Not Exercise Call (Leaves ( P_I )'s Share with ( P_I ))</th>
<th>( P_2 ) Exercises Call (Buys ( P_I )'s Share at ( P_I )'s Valuation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( P_2 ) Does Not Exercise Put (Keeps Own Share)</td>
<td>Status Quo</td>
</tr>
<tr>
<td>( P_2 ) Exercises Put Option (Sells Own Share to ( P_I ) at ( P_I )'s Valuation)</td>
<td>( P_2 ) Forces ( P_I ) To Buy Him Out</td>
</tr>
</tbody>
</table>

These two sets of choices yield the four combinations shown in Figure 3. The two shaded cells are not feasible choices, however, if unified ownership is the goal;\(^{121}\) the upper-left cell represents the status quo, and the lower-right cell represents a meaningless swap of shares and cash. In practical terms, then, \( P_2 \) will decide, after hearing \( P_I \)'s valuation, to exercise either the call or the put. Once \( P_I \) has made her valuation, it is irrevocable; \( P_I \) cannot backpeddle when she learns what sort of transfer \( P_2 \) selects.

The forced pairing of a call and a put in this context creates much stronger pressures toward an honest statement of a reservation price than would a call or a put alone. In either the call or the put case, the offeror will attempt to gain as large a share of the surplus as possible. In the Texas Shootout case, however, it is impossible to price in a way that adds surplus for one's own side without also adding surplus for the other side.\(^{122}\) Value the partnership share too high, and one will get stuck buying out one's partner at a price that is more than the

\(^{121}\) See Brooks & Spier, *supra* note 117, at 3 (observing that a Texas Shootout clause would be used after a triggering event makes sole ownership more valuable than joint ownership); *id.* at 6–7 (discussing some reasons why unified ownership might become more valuable).

\(^{122}\) See *id.* at 8 ("[T]he Texas Shootout mechanism gives a large part of the bargaining surplus to the other side, surplus that may be retained with simple offers to buy or sell."). This division of surplus would not necessarily occur, however, if the party stating the valuation knew enough about the other party's valuation to be able to accurately guess whether a particular valuation would prompt a buyout or a sellout. See Abramowicz, *supra* note 81, at 365–66 (noting that knowledge of the other party's valuation can prompt divergences from "perfectly honest valuations"); *cf. supra* notes 95–96 and accompanying text (discussing the potential for strategic cake-cutting when the party doing the slicing has insight into the valuation of the other party).
buyout is worth. Value it too low, and one will lose one’s own share at a price that is less than it is worth.\footnote{123}

The Texas Shootout model can be readily applied to the grazing entitlement discussed above.\footnote{124} In the partnership case, it is clear from the outset that each party owns one half of the total partnership entitlement. The grazing entitlement is not predivided in this way, but rather is the subject of dispute; each party claims to own all of it. Yet the judge could decide to behave Solomonically and treat the entitlement as if it were divided equally between the parties.\footnote{125} If this arrangement were acceptable on distributive grounds, it would then be a simple matter to apply the Texas Shootout procedure to the grazing example.

\(O\) would be required to indicate the value of “her half” of the grazing entitlement. Because the two halves of the entitlement are fungible, this valuation would also constitute a valuation of “\(C\)’s half.” Her valuation would not only create a call option for \(C\) that would allow him to buy out her (\(O\)’s) half, but also a put option for \(C\) that would entitle him to force her to buy his half.\footnote{126} In other words, \(O\) is “slicing the cake” by filling in a value for \(x_o\) in the following variation on the games presented above:\footnote{127}

\begin{figure}
\centering
\begin{tabular}{|c|c|}
\hline
\textbf{\(O\) Can Graze} & \textbf{\(O\) Cannot Graze} \\
\hline
\textbf{\(C\) Receives Half of \(x_o\) from \(O\)} & \textbf{\(C\) Must Pay Half of \(x_o\) to \(O\)} \\
\hline
\end{tabular}
\caption{}
\end{figure}

\footnote{123} Just as in the cake-cutting example, any inequality that one partner builds into the possible payoffs will hurt her, as her partner would be expected to choose the more valuable payoff (in this case, either the partnership share or the dollar amount).

\footnote{124} See \textit{supra} pp. 1425–26.

\footnote{125} \textit{Cf.} Ayres & Talley, \textit{supra} note 1, at 1034 (discussing a situation in which each of two parties has a probabilistic (fifty percent) claim to an entitlement, which effectively divides the entitlement in half).

\footnote{126} \textit{Cf.} Abramowicz, \textit{supra} note 81, at 366 (describing a mechanism that would first ask a rancher to name a dollar figure that represents the value to him of grazing his cattle on the farmer’s land and would then give the farmer a choice between paying the rancher that amount to keep the cattle off the land or demanding that the rancher pay that amount for grazing rights). In fact, the rancher should provide a valuation of \textit{half} the entitlement — or else the mechanism should divide the stated valuation figure in two before giving the farmer the choice of exercising a call or a put on the entitlement. \textit{Cf.} MOULIN, \textit{supra} note 115, at 43 (describing an estate division mechanism in which the higher-bidding party must pay half her bid to the other party). If the game is set up properly, \(C\) will choose State 1 (\(O\) can graze) when \(C\)’s valuation of the grazing entitlement is lower than that of \(O\), and \(C\) will choose State 2 (\(O\) can’t graze) when \(C\)’s valuation of the grazing entitlement is greater than that of \(O\). If \(C\) is choosing between \textit{paying} \(O\)’s valuation in State 2 (\(O\) can’t graze) and \textit{receiving} \(O\)’s valuation in State 1 (\(O\) can graze), the difference between choosing State 1 and State 2, in terms of financial implications for \(C\), is not just \(x\), (as it should be if we wish \(C\) to choose correctly), but rather twice that amount, or \(2x\).

\footnote{127} More formally, \(O\)’s valuation completes the following equation: \(S_i - \frac{1}{2}x_o = S_{x_o} + \frac{1}{2}x_o\).
This adaptation of the Texas Shootout framework is a very attractive dispute resolution procedure that operates in a more tailored fashion than ordinary liability rules. It economizes on information not only by forcing one party to respond to an option, but also by forcing the other party to specify the price of that option. As a distributive matter, however, it may not always be desirable for entitlements to be split fifty-fifty in this manner.

To hint at the range of design choices available, consider another equivalent set of payoffs that O's valuation might create:

<table>
<thead>
<tr>
<th>O Can Graze</th>
<th>O Cannot Graze</th>
</tr>
</thead>
<tbody>
<tr>
<td>C Receives 1% of $x_o$ from O</td>
<td>C Must Pay 99% of $x_o$ to O</td>
</tr>
</tbody>
</table>

Here, $O$ must give $C$ the choice between collecting one percent of her ($O$'s) stated valuation (and allowing $O$ to keep the entitlement) and acquiring the entitlement outright for ninety-nine percent of $O$'s stated value. While $O$'s incentives with regard to shading her valuation in each direction are not matched equally, each of her possible payoffs is linked to the valuation she provides. If she raises her valuation to improve the payoff on the right-hand side of the equation, she must be willing to back up that valuation with dollars on the left-hand side. Here, too, uncertainty over whether one will end up buying or selling fungible portions of an entitlement helps to keep valuations of that entitlement honest.

It is important to emphasize that it is the presence of the same term ($x_o$) on both sides of the payoff choice set that constrains valuations. Valuation statements are not constrained merely because one does not know whether one will emerge as a buyer or a seller in the unification of a divided entitlement. It is also necessary that one's valuation of what one has to sell have implications for the value of the portion one might be buying.

128 This possibility can be expressed with the following equation: $S_{i_o} - \ell_{i_o} x_o = S_{2_o} + 99\% x_o$.

129 The fact that a surplus-producing assembly is divided between two parties does nothing on its own to prompt honest bargaining. Consider a life-saving pharmaceutical compound that requires two ingredients, $A$ and $B$, that are owned, respectively and exclusively, by Able and Baker. Putting $A$ and $B$ together may generate a huge surplus, and it may be unclear to both Able and Baker whether Able will end up buying $B$ or Baker will end up buying $A$. But these facts do not smooth the path for bargaining; on the contrary, the situation remains one of bilateral monopoly. Able can claim that $A$ adds 99.9% of the value to the compound and that he should receive a similar proportion of the available surplus; this claim is consistent with valuing his own share at a high level and Baker's share at a very low level.

130 This was transparently true in the Texas Shootout scenario, because the two halves in question were identical — valuing one's own half necessarily meant valuing the other party's half as
C. Getting to ESSMO (Entitlements Subject to Self-Made Options)

Now that we have seen both how real options add value and how mechanism design constrains self-assessed valuations, we can turn to the formulation of entitlements. This section examines entitlements that come with option-making obligations attached to them. In section I.C.1, I explain how requiring an entitlement holder to set an option differs from simply allowing option making or leaving parties to bargain in the shadow of property rules or liability rules. Section I.C.2 shows how this approach draws on and extends existing work that incorporates elements of self-assessed valuation in two-party settings. Section I.C.3 presents some examples of mandatory option making in dynamic, multiparty settings, taken from the self-assessed valuation literature.

1. Mandatory Self-Made Options. — A party whose entitlement is protected by a property rule (such as the home seller in our earlier example) can always choose to offer options to would-be buyers, but typically does not have to make such options available. If a seller chooses to make such an option available, the option holder typically must compensate the seller for giving up some of the interests that accompany full property-rule-protected entitlement ownership. But it is possible to imagine differently structured entitlements that effectively make option setting a mandatory component. Such required options can achieve efficiency results that are unattainable through ordinary property rule protection, even though the latter always encompasses the choice to offer options voluntarily.\textsuperscript{131}

There is, of course, nothing oxymoronic about an entitlement form that requires people to set up options. The "optional" aspect of any option is in the hands of the party who holds the option and can well. In other instances, there might be an incomplete or questionable correspondence between the values of two components for which unification would be efficient. Consider Ayres and Talley’s example of a temporally divided entitlement to Blackacre in which one party holds a life estate, while the other holds a remainder. See Ayres & Talley, \textit{supra} note 1, at 1030–31, 1034 \& n.24. These two fragments might appear to have tightly linked values; indeed, there are established techniques for determining, based on the age of the life tenant, what percentage of the market value of the particular piece of property is contained in the life estate. See JESSE DUKEMINIER \& JAMES E. KRIER, \textit{Property} 229–30 (5th ed. 2002) (discussing the use of Treasury Department regulations based on life expectancy tables to value life estates). Each party could claim an idiosyncratically high value for his or her own share, nonetheless, based on factors that would not similarly inflate the value of the other party’s share. For example, the owner of the life estate could assert that her personal family history suggests she will live to be 120, rather than the 80-odd years predicted by the actuarial tables. Likewise, the remainderman could assert a desire to keep the land in the family that could only be dislodged at a very high price.\textsuperscript{131} Cf. Brooks & Spier, \textit{supra} note 117, at 3–4 (showing that parties will not voluntarily choose the Texas Shootout arrangement ex post, despite its efficiency, and suggesting the efficiency advantages of an ex ante contract term that gives one or both parties "trigger rights" to force the other to make a shootout-style buy-sell offer).
choose whether or not to exercise it. But it is necessary to say a bit more about the nature of required option making in order to address concerns that these "mandatory options" would constitute improper infringements on autonomy.

As a first cut, it bears emphasis that parties are already "forced" to offer options to others in many commonplace legal contexts. Whenever an entitlement is protected by a liability rule, as is typically the case in contract law and often the case in other settings, the party who starts out without the entitlement holds an option to obtain it unilaterally upon the payment of damages. Thus, whenever the law fails to grant an injunction or similar order, it effectively recognizes an option written against the entitlement holder. Compared with a regime in which the option's exercise price is set by a third party such as a court, the ESSMO form provides additional protection for entitlement holders by letting them set the applicable exercise prices. In other words, holders of ESSMOs would operate within a name-your-own liability rule regime.

A move from an ordinary liability rule to an ESSMO thus enhances the entitlement holder's autonomy. It remains true, however, that substituting an ESSMO for a property rule diminishes the entitlement holder's claim on the entitlement to some degree. Even if this is justifiable on efficiency grounds, it might be objectionable on normative grounds. Here, however, it is worth considering the many ways in which option making might be made mandatory. It need not be made mandatory across the board by a governmental entity, but might instead be made a condition of participation in some particular interaction with others. Parties might choose to enter into entitlement regimes in which their claims are protected by ESSMOs if

132 See, e.g., Rose, supra note 7, at 2178-79 (describing a liability rule as a "property right subject to an option").

133 The diminution occurs because the ESSMO must be designed in a way that makes option setting meaningful — which in turn requires a party to give up something when setting an exercise price at a particular level. If parties were merely required to write options but no constraints were put on permissible exercise prices, nor on subsequent bargaining, then parties could choose high exercise prices that replicate property rule protection in order to enhance their bargaining positions.

134 The complaint would not be undercompensation as such, which is the usual reason for preferring property rules to liability rules, but rather two other concerns. The first might be based on a broad notion of autonomy in entitlements that includes an absolute right to veto any and all transfers. Second, the fact that the mechanisms that ensure honest valuations typically involve payments (as well as potential receipts) that are linked to the stated valuation might raise distributive concerns. One can address these distributive concerns to some extent through choice of design features and initial entitlement allocation.

135 In other words, one would opt into a regime featuring a "participation constraint" that would require one to engage in a given valuation exercise and accept the consequences that go with it. Cf. Knysy, Goldbart & Ayres, supra note 6 (manuscript at 56-57) (noting the potential significance of the participation constraint for their methodology).
the gains they enjoy by obtaining options on the entitlements of others outweigh the costs of having to write options on their own entitlements.\textsuperscript{136}

In order to work, ESSMOs must include protections against unconstrained exercise prices. If an option-making requirement were simply appended to an entitlement previously protected by a property rule, people who wished to maintain property rule levels of protection would simply name a ludicrously high price. Because nobody would have a valuation that high, the entitlement holder would effectively hold a veto over any transfer, just as in a property rule regime. Thus, to make mandatory option making meaningful, there must be a way to constrain valuations not only from the bottom, but also from the top.

Conveniently, a great deal of design freedom is added by the mandatory nature of the option-making component, which makes it possible to flip the usual situation in which the party without the entitlement must pay a positive price to obtain an option on that entitlement.\textsuperscript{137} When options are mandatory rather than voluntary, the party who is required to set the option can also be required to back up the exercise price—for example, by paying the other party based on the level at which the exercise price is set.\textsuperscript{138} In this way, mandatory option making can be structured to constrain valuations from both above and below. Ideally, setting the option too high would be just as costly in expected value terms as setting it too low. That ideal may be unattainable in real-world settings, but serviceable constraints on valuations can be formulated by pairing both of the possible payoffs available to an individual (the payoff she gets if the option is exercised, and the payoff she gets if it is not exercised) to her valuation of the entitlement in question. This is, of course, the possibility suggested in the previous section.

\textsuperscript{136} See infra Part II (presenting an example of mandatory option making within the context of a private neighborhood); cf. Robert P. Merges, Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations, 84 CAL. L. REV. 1293 (1996) (discussing the benefits of permitting parties to contract into organizations governed by liability rules).

\textsuperscript{137} To be sure, options are offered for free in many settings. See, e.g., Katz, supra note 48, at 2236–38 (noting differing cancellation policies in consumer contexts, including the ability to cancel free of charge in some cases); Scott & Triantis, supra note 32, at 1430–31, 1458 & n.119 (providing the example of retail return policies and noting that such “free options” are common). Such free options may serve as a cheap form of product promotion or may provide signals about product quality that allow a seller to reap more surplus from product sales. See id. at 1472 & n.151. Victor Goldberg posits that the positive price such “free” options would otherwise carry may have been fully counterbalanced by an implicit “payment” that the seller wants the buyer to make—the costly acquisition or production of information about the item offered for sale. See GOLDBERG, supra note 78, § 2.2 (manuscript at 11) (discussing this idea in the context of a free option to purchase commercial property).

\textsuperscript{138} Actually paying out money may not be necessary if the entitlement holder is charged based on the exercise price through required concessions on other contract terms.
Consider how mandatory option making differs from simply allowing people to bargain in the shadow of either property rules or liability rules. Bargaining in the shadow of property rules generates a well-known potential for impasse, as already noted. The desire of each party to obtain a disproportionately large share of the available surplus can derail deals that are worth doing from every party's perspective. Bargaining may also be empirically difficult for other reasons. Perhaps the parties have trouble identifying or communicating with each other, or are reluctant to interact because of ill will between them. Option making structures the interaction between the parties and proxies for the kind of bargaining that may be impossible in a given case. Self-made options sidestep the potential for impasse by giving one party the unilateral ability to effect an entitlement transfer at the price set by the other party. In addition, option making requires a commitment to a particular exercise price that is irrevocable during the exercise period — a commitment that no holder of an entitlement protected by a property rule is required to make.

Of course, liability rules of all sorts represent options. Why are self-made options superior to ordinary liability rules, coupled with the ability to bargain? Again, the possibility that the parties simply will not bargain must be taken into account. If they do not bargain, then the potential for inefficiency presented by imprecisely set liability rules remains. But even if parties are willing to negotiate to overcome the effects of an inaccurate damage measure, their interactions will lead less directly and reliably to an efficient outcome than would option making.

Ian Ayres and Eric Talley correctly emphasize that useful private information about an entitlement holder's valuation can be gleaned by observing the type of offer the entitlement holder makes in the shadow of a liability rule: "An offer to bribe signals that the entitlement holder's valuation is greater than the damage amount, while an offer to sell signals that her valuation is less than the damage amount."

The information elicited under Ayres and Talley's model, however, serves merely to "partition" entitlement holders into two groups — those with private valuations above the exercise price, and those with private valuations below the exercise price. Hence, the richness of

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139 See Rose, supra note 7, at 2184 (classifying these kinds of transaction costs as "Type 1").
140 See, e.g., Farnsworth, supra note 76, at 384 (observing that animosity between the parties often presented an impediment to postjudgment negotiation in the cases he studied).
141 This advantage has been noted in the context of multiround liability rules. See AYRES, supra note 55, manuscript at 78 (explaining that "higher-order liability rules" represent "internal auctions" that remove bargaining obstacles by "setting clear choices and structuring responses").
142 Ayres & Talley, supra note 1, at 1039.
143 Id. at 1044-45.
information elicited in the shadow of an ordinary liability rule is of the "is it bigger than a breadbox?" variety. Moreover, once Coasean bargaining is set into motion by the entitlement holder (either with an offer to bribe the option holder not to exercise the option, or with an offer to sell the underlying entitlement to the option holder), the option holder has a magnified incentive to strategically misrepresent her valuation.144

In an effort to force information from both parties rather than from only the entitlement holder, Ayres and Balkin subsequently added more bargaining rounds through compound "higher-order" liability rules.145 This innovation, while conceptually intriguing, is a cumbersome and often unrealistic method to get at private entitlement valuations.146 Adding more and more rounds of liability rules is an advance akin to replacing a single question ("is it bigger than a breadbox?") with a litany of twenty such questions. In theory, bargaining parties could eventually home in on each other's private valuations. In reality, the parties are likely to tire of each other and of the game long before they can learn much from it. Option making offers an alternative to the guessing-game format of iterative liability rules.

2. Moving Toward ESSMOs, Two by Two. — Developments in two areas of legal scholarship have recently begun to converge, by way of options analysis, on the use of self-assessed valuations in structuring legal entitlements for two-party situations. First, scholars working on theoretical analyses of contracts have begun to use options language to characterize termination provisions. Second, scholars extending and refining the Calabresi and Melamed framework have begun to apply self-assessment devices to their hallmark example — the pollution dispute between a factory and a nearby resident or laundry. The increasing resort to ESSMO-like ideas in these analyses of two-party cases establishes the generality and usefulness of this conceptual approach, but it only begins to hint at the full potential of the ESSMO form.

For the most part, contracts operate under a liability rule regime — specific performance is limited to a few classes of situations.147 Consistent with an understanding of liability rules as options, recent work has characterized termination clauses in contracts as embedded options.148 To the extent permitted by law, contracting parties can cus-

144 See id. at 1043-44, 1055-56.
145 Ayres & Balkin, supra note 24; see also Ayres & Goldbart, supra note 8, at 51-79 (discussing and extending the Ayres & Balkin analysis).
146 See Kaplow & Shavell, supra note 8; Knysh, Goldbart & Ayres, supra note 6, at 3 (noting criticisms of higher-order liability rules).
148 See, e.g., Scott & Triantis, supra note 32, at 1456.
tomize those liability rules by specifying damages\textsuperscript{149} — that is, by wri-
ting their own options for each other. Hence, a party inserting a liquid-
dated damages clause into a contract holds an ESSMO in the con-
tract's performance. There is a potential efficiency advantage to
allowing parties to customize in this fashion, as is the case with other
ESSMOS. Just as with other ESSMOS, however, it is important to
consider whether the options will be priced in a way that will yield ef-
ficient results.\textsuperscript{150}

Other analogues and antecedents to the ESSMO idea have ap-
peared in work on entitlement protection choices. For example, Ian
Ayres and Kristin Madison have discussed the possibility that a defen-
dant could use private additur to influence a plaintiff’s choice between

\textsuperscript{149} See, e.g., id. at 1454 & n.108 (suggesting that parties may be dissuaded from stipulating effi-
cient damages by concerns about enforceability, and observing that stipulated damages were in-
validated as penalties in thirty-seven percent of a sample of 109 recent cases in which enforceabil-
ity was at issue).

\textsuperscript{150} We might initially suppose that market forces would provide an automatic check on damage
clauses, based on the relationship between termination provisions and other contract terms. For
example, an airline ticket with a $100 cancellation fee will be less expensive than a fully refund-
able ticket. See, e.g., id. at 1457–58, 1468–69 (noting the inverse relationship between the contract
price and the cost of walking away). If markets are operating properly, one cannot disadvantage
a buyer through a termination provision without providing compensation deemed sufficient by
that buyer elsewhere in the contract’s terms, and vice versa. This does not mean there will neces-
sarily be a dollar-for-dollar offset — one party may be in a better position to bear risk than an-
other, see id. at 1460–76 — but it does suggest that the resulting two-part price (option price plus
exercise price) must remain competitive in the eyes of the consumer as compared with other avail-
able combinations of those terms.

Cognitive work raises a question about this story. People have a limited ability to process
information and tend to make decisions based on a few salient characteristics, price among them. See Russell B. Korobkin, Bounded Rationality, Standard Form Contracts, and Unconscionability, 70 U. CHI. L. REV. 1203, 1216–44 (2003). If people neglect to focus on the damages clause, or fail
to recognize the true probability that breach will become necessary, they may not demand compen-
sation in the price term of the contract to make up for a high damages term. See, e.g., Katz,
supra note 48, at 2188, 2212–13, 2238–39 (discussing the role of framing in the options context and
noting the possibility that parties may not fully appreciate the risk of breach); see also Oren Bar-
Gill, Pricing Legal Options: A Behavioral Perspective (Aug. 23, 2004) (unpublished manuscript, on
file with the Harvard Law School Library) (discussing the possible roles of overoptimism and
overconfidence biases in option pricing). This cognitive concern is not addressed by establishing,
as Robert Scott and George Triantis do, that a nominally unrestricted contract with a high liqui-
dated-damages clause can be conceptualized as comprising an option that privileges one to per-
form for the balance of the contract price. See supra note 56 (discussing alternative ways of char-
acterizing liquidated damages). However, explicitly framing the interaction as one in which a
customer makes an upfront payment to purchase an option to perform should make the upfront
payment (the economic equivalent of liquidated damages) more salient. See Katz, supra note 48,
at 2228–29; see also GOLDBERG, supra note 78, § 4.4 (manuscript at 27–28) (explaining that a non-
refundable deposit forces the parties to explicitly price the option in question). The significance of
such framing effects can perhaps explain why explicitly worded option contracts are treated dif-
ferently by courts than are direct economic analogues that are not presented in option format. See
Katz, supra note 48, at 2200–01, 2228–29 (noting the different legal treatment of explicit options,
and suggesting that explicitly recasting a penalty as an option and requiring an upfront payment
could help to overcome the misperceptions and myopia of less sophisticated parties).
damages and injunctive relief in a legal regime that offers both alter-
natives. A defendant polluter who knows that the plaintiff resident
has the right to either shut down the factory or collect court-calculated
damages could increase the damages amount in an effort to forestall
an election of the injunction. In other words, the defendant can
write a customized put option that incorporates information about its
private valuation of polluting. Another parallel is found in a discus-
sion by Ayres and Balkin of remedies for contract breach. In the
event of impending breach, a party for whom breach might be very
costly could provide a valuation that would confer on the other party a
choice between paying an extra amount of damages based on that
valuation or receiving an extra payment for performance based on that
valuation.

Some recent efforts have focused more explicitly on allocating enti-
tlements and awarding damages based on the parties' own valuations,
elicted through mechanism design. Responding in part to the un-
wieldiness of the Ayres and Balkin multiple-round liability rule game
described earlier, Sergey Knysh, Paul Goldbart, and Ian Ayres have
formulated an information-forcing mechanism that does its work by
simply requiring the parties to provide their valuations to a third-party
decisionmaker such as a judge. The judge would then award the
entitlement to the party with the higher valuation, and give the other
party damages according to a preset curve that is based on the valua-
tions of both parties. The application of mechanism design to elicit
honest valuations in this setting shares some of the intuitions of the
current project.

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151 See Ian Ayres & Kristin Madison, Threatening Inefficient Performance of Injunctions and
Contracts, 148 U. PA. L. REV. 45, 79-81 (1999). Ayres and Madison also discuss the converse pos-
sibility, that a plaintiff could use private remittitur to reduce damages, so as to influence a defen-
dant to pay rather than perform. Id. at 82-84.
152 The concern that prompted Ayres and Madison's approach is that a plaintiff might ineffi-
ciently seek an injunction in order to extract a larger damages amount from the defendant. By
coupling inalienable injunctions with opportunities for additur and remittitur as Ayres and Madi-
sion suggest, such strategizing, and the costs and risks of impasse associated with it, could be
avoided. See id.; see also Ayres, supra note 40, at 831 n.109 (introducing this idea briefly).
153 See Ayres & Balkin, supra note 24, at 746-47.
154 See id. As in the Texas Shootout scenario, the valuation would create both a call and a put
in the party who is threatening to breach.
155 See id.
156 See Knysh, Goldbart & Ayres, supra note 6, manuscript at 3.
157 Id. Under this system, overvaluation is constrained by the risk of having to pay too much
in damages to the other party, while undervaluation is constrained by the risk of being insuffi-
ciently compensated by the other party.
158 A paper by Ronen Avraham and Eyal Erenberg also shares some common ground with the
present project. See Ronen Avraham & Eyal Erenberg, Liability Rules and Modular Liability
Rules: Another Ex-Ante View of the Cathedral (Mar. 2003) (unpublished manuscript, on file with
the Harvard Law School Library). Avraham and Erenberg ask how the representations that par-
While these examples help to illustrate the intuitive appeal of the ESSMO entitlement form, the form itself is far more flexible than these two-party situations suggest. Notably, ESSMOs need not require the intervention of a judge who collects valuations and makes decisions based on them at a given moment in time. Instead, parties can write options and respond to them on their own as information unfolds, perhaps through an administrative interface. The option-making alternative is uniquely well-suited to dynamic, multiplayer situations in which parties, or a collective body, would find it useful to track heterogeneous private valuations over time. The examples in the next section show how ESSMOs can be designed to work in such settings.

3. Multiplayer ESSMOs in Dynamic Settings. — ESSMOs designed for dynamic, multiparty situations appear in the literature on self-assessed valuation mechanisms. One intriguing historical example is the law of general average contribution in admiralty. To save a ship in a storm, a captain might need to toss some of the cargo overboard. How should the captain decide which cargo to jettison, and how should the owner of the discarded cargo be compensated? Both questions were satisfactorily answered by requiring shippers to place a value on their own goods, and attaching two implications to...
that valuation. First, valuations were made the basis for apportioning the costs of compensating anyone whose cargo was thrown overboard. Second, valuations determined how much one would be compensated in the event one’s own cargo was thrown overboard. These two implications served to constrain valuations from the top and the bottom, respectively. Value one’s goods too low, and they become more likely to be tossed overboard, in which case one will get too little compensation. Value one’s goods too high, and one will almost certainly avoid having them cast into the sea, but one will have to pay proportionately too much to compensate the owners of the goods that were jettisoned.

This information-forcing mechanism can be translated into the language of options. Each merchant enters a system in which his entitlement to the shipment is protected only by a call option, but the call option’s exercise price is self-set. In short, the merchant holds an ESSMO. The captain acts as an agent for the other merchants, who can collectively acquire the right to discard a given shipment by together covering the exercise price selected by the shipment’s owner. Hence, there is a system of reciprocal options in which each merchant is at the same time a holder of call options on all other shipments (collectively with the other merchants, using the captain as an agent) and a call option maker for his own shipment.

To put it another way, we might view each merchant as granting the collective both a call and a put option on the shipped goods, conditioned on the occurrence of a storm severe enough to require that some goods be jettisoned. The moment such a storm arises, the captain (acting for the collective) gains fractional rights over all the shipped goods. The fraction acquired by the captain on behalf of the collective depends on the severity of the storm and the resultant fraction of the total value that must be jettisoned in order to save the balance. The captain is then in the position of exercising either a call option (on the portion still owned by the shipper) or a put option (on the portion that the collective acquired when the storm arose). If the captain

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163 The vessel master also had to value the vessel itself, and a parallel pair of implications attached to that valuation. See Levmore, supra note 25, at 860 n.214; see also Epstein, supra note 81, at 582; infra note 168.
164 Epstein, supra note 81, at 582.
165 Id.
166 Id. at 583.
167 Id.
168 The merchants hold a parallel option vis-à-vis the owner of the hull, who must also provide a valuation of his vessel. The merchants can acquire the vessel at the stated valuation or can collect a contribution toward compensating the owner of the lost goods that is proportional to the valuation. See Levmore, supra note 25, at 860 n.214.
169 Cf. supra p. 1431 (discussing the possibility that a grazing entitlement could be conceptually split between two parties by a judge acting Solomonically).
chooses to exercise the call option on a given shipment, he acquires it on behalf of the group at the stated valuation, for purposes of throwing it overboard. If the captain instead chooses to exercise the put option with regard to a particular shipment, he forces the merchant to "buy back" the right to her own safely delivered goods. The exercise price for the put is that merchant's proportionate share of paying for the overboard goods that saved the vessel. The various merchants therefore hold a reciprocal web of options on each other's goods.

Significantly, merchants' valuations are made under conditions of ignorance about the uses to which those valuations will be put. One cannot predict what valuations other merchants will choose, and one does not know whether, or how much, cargo will be jettisoned. Nobody knows whether their valuation will eventuate in a forced sale (exercise of a call option) or a forced purchase (exercise of a put option) or neither. There is a cost, in expected value terms, to deviations from true valuations in either direction. The less fairly one values one's own goods, the more likely it is that one will lose out by reason of that unfairness. As in the cake division games, the merchants have an incentive to set values in a way that will roughly equalize their possible payouts. If we assume that an average storm will require discarding goods worth one-hundredth of the full shipment, then each merchant faces a valuation problem roughly similar to the one shown in Figure 5, above. One possible payoff requires compensating others based on a self-assessed valuation, and the other possible payoff consists of that stated valuation.\footnote{In this example, the costs of both high and low valuations can be expressed as expected values. But the same information-forcing advantages can be achieved through a system that imposes a known cost or benefit per increment of valuation, so long as the advantages of a too-high valuation are balanced with those of a too-low valuation. Instead of bearing an expected share of payment for someone else's jettisoned goods, one's payment could be made certain through an insurance scheme. \textit{Cf.} Levmore, \textit{supra} note 25, at 810–11 (noting that one's first-party insurance coverage could be the basis for self-assessed tort damages; one would be required to back up one's valuation with premium dollars).}

A second example addresses valuation problems in the property tax setting by letting people set their own property values.\footnote{See, e.g., \textit{id.} at 778–83 (discussing literature on property value self-assessment). Although property self-assessment has usually been conceptualized as a way of solving property tax valuation problems, with the possibility of forced sales serving merely as a check on valuations, option writing has also been discussed as a way of addressing difficulties presented by eminent domain itself. \textit{See} Robert Cooter, \textit{Unity in Tort, Contract, and Property: The Model of Precaution}, 73 \textit{CAL. L. REV.} 1, 22–23 (1985) (suggesting that allowing the government to purchase options from property owners would induce both parties to make efficient choices, but noting that additional transaction costs might swamp the benefits generated in this way).} Overvaluation is constrained because people must pay taxes based on the valuation amount. Some mechanism must also be devised to constrain undervaluation, however. One possibility is to allow the government (or,
more broadly, any willing buyer) to acquire the property based on the valued amount.\textsuperscript{172} This would amount to transforming the homeowner's property into an ESSMO. The person who drops her self-selected property value to avoid taxes may find that her property has become an attractive site for acquisition. Likewise, someone who receives a large amount of consumer surplus from a particular property can lock in his right to that surplus only by paying taxes that reflect the surplus.\textsuperscript{173} There are some considerations that weigh against adopting this methodology in the property tax context,\textsuperscript{174} but the basic idea of inducing truth-telling by matching the consequences of overvaluation and undervaluation is an important one.\textsuperscript{175}

As these examples vividly illustrate, the ESSMO methodology can be adapted to multiparty interactions under uncertain, evolving conditions. In the next Part, I present an extended example that shows how

\textsuperscript{172} See Levmore, supra note 25, at 778–79, 789–90; see also RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 57 n.3 (6th ed. 2003) (tracing this idea to ancient Athens). One variant of this idea would permit compulsory acquisition upon payment of a premium, such as twenty percent, over the valuation amount; another variant would allow the property owner to avoid having the property forcibly purchased by revaluing it at an even higher amount, such as twenty-five percent above the original assessment. See Daniel M. Holland & William M. Vaughn, An Evaluation of Self-Assessment Under a Property Tax, in THE PROPERTY TAX AND ITS ADMINISTRATION 79 (Arthur D. Lynn, Jr. ed., 1969) (describing and discussing self-assessed property tax proposals by Arnold Harberger, Nicholas Kaldor, and others, as well as these proposals' vulnerabilities to strategic behavior); see also Levmore, supra note 25, at 784–88 (working through alternatives that would not involve forced sales).

\textsuperscript{173} See Levmore, supra note 25, at 780.

\textsuperscript{174} For example, there may be concerns about attaching taxes to increments of subjective valuation generated by individuals' community-specific investments. Because such investments tend to generate positive spillovers by promoting more stable and cooperative communities, they should arguably be subsidized rather than taxed. Indeed, it is not clear whether it is appropriate to tax people based on the amount of consumer surplus they derive as a result of their idiosyncratic tastes or their property-specific investments that are internal to the property (such as built-in bookshelves). See id. at 780–81 (discussing and responding to concerns about taxing individuals' surplus in their homes). Another problem with the proposal, at least to the extent that it contemplates compulsory governmental acquisition, is the possibility that acquiring undervalued properties at the stated value would run afoul of the Constitution's "just compensation" requirement. See id. at 778 n.25. For an extended discussion and critique of self-assessment for property taxes, see Holland & Vaughn, supra note 172.

\textsuperscript{175} Levmore discusses another self-assessment example that employs a similar protocol — the valuation of horses in "claiming races." Levmore, supra note 25, at 860 n.214. In deciding what level of race to enter a horse in, an owner makes a choice with two implications: 1) it determines the quality of the competition that the horse will face; and 2) it sets a price at which the horse can be purchased before the race by any other owner with a horse competing at the same meet. For example, to enter one's horse in a $10,000 claiming race means putting one's horse up for sale for $10,000 during the period before the race begins and letting it compete against similarly valued horses. See id. Value the horse too high, and the horse will be outmatched in the race. Value the horse too low, and it can be snapped up by another owner at an inadequate price before the race begins. This system leverages private information to sort the competition into tiers; hence, it makes racing more competitive at every level. See id.
ESSMOs might be employed to control spillovers within a private neighborhood setting.

II. OPTION MAKING IN THE NEIGHBORHOOD COMMONS

In a neighborhood, privately owned lots and houses are bundled with a particular environment or atmosphere, which we might think of as an ambient commons or local public good. Individual homeowners can fail to invest in this neighborhood commons or can degrade it through acts on their private land. If residents fail to take into account the positive and negative externalities that their acts generate in the neighborhood, the neighborhood’s atmosphere can fall victim to a “tragedy of the commons.”

One increasingly popular response to this possibility is the private neighborhood development, which combines sorting, contracted-for restrictions, and centralized enforcement.

In this Part, I explore the potential for using ESSMOs to control aesthetics in these private developments. Private neighborhoods present a particularly interesting context for exploring the potential of new entitlement forms for at least three reasons. First, private neighborhoods are an increasingly important locus of land use control. Covenant-controlled private residential developments house roughly fifty million Americans, and their market share of residential housing is rapidly increasing. The abundance of litigation in these commu-


177 See Garrett Hardin, The Tragedy of the Commons, 162 SCIENCE 1243 (1968). Literature on the commons distinguishes an “open access” commons—a resource everyone can use—from a “limited access” commons that is open to only a limited number of people. See, e.g., Elinor Ostrom, Governing the Commons: The Evolution of Institutions for Collective Action 48 (1990); Carol M. Rose, The Several Futures of Property: Of Cyberspace and Folk Tales, Emission Trades and Ecosystems, 83 MINN. L. REV. 129, 155 (1998). The neighborhood commons would fall in the latter category. The capacity of nonlegal mechanisms such as social norms to forestall tragedy in limited-access commons settings has been well noted. See, e.g., Ostrom, supra, at 35-37, 88-89, 205-07 (stressing the role of norms in managing common pool resources). I will discuss the role of norms in section II.C.2.

178 By “private neighborhood development,” I mean developer-conceived communities that control land use through a set of reciprocally binding covenants, under the governance of a homeowners’ association. These types of communities have gone by a wide variety of names, including “common interest developments,” “common interest communities,” “proprietary communities,” “residential community associations,” “homeowners’ associations,” “property owners associations,” and so on. My example here will focus on a private development made up of single-family homes.

179 The Community Associations Institute estimated that there were 249,000 community associations in the United States in 2003, housing approximately fifty million people. Cmty. Ass’ns Inst., Data on U.S. Community Associations, at http://www.cainonline.org/about/facts.cfm (last visited Feb. 13, 2005); see also Nancy L. Rosenblum, Membership and Morals: The Personal Uses of Pluralism in America 112 (1998) (noting that seventy percent of new
nities suggests that experimentation beyond the present constrained repertoire of entitlement approaches could be worthwhile.

Second, private neighborhoods are uniquely situated to experiment with different entitlement forms. Private neighborhoods are both legally and politically freer to engage in creative entitlement restructuring than a governmental entity would be. As relatively small, self-contained land use control regimes formed ab initio and by contract, these communities offer excellent small-scale testing grounds for different alternatives.

Third, the private neighborhood example, unlike the typical two-party example that dominates the literature, confronts the kinds of considerations that come up in dynamic "commons" settings — multiplayer contexts involving reciprocity and repeat play.

Using this ex-

housing in Los Angeles and San Diego counties is within residential community associations and that such communities "make up more than 50 percent of new home sales in the fifty largest metropolitan areas").


See, e.g., ROBERT H. NELSON, PRIVATE NEIGHBORHOODS AND THE TRANSFORMATION OF LOCAL GOVERNMENT (forthcoming 2005) (manuscript at preface, at 12, and ch. 3, at 21, on file with the Harvard Law School Library) (noting the lack of experimentation in private community governance); Fennell, Contracting Communities, supra note 36, at 854–59 (explaining that most private communities rely on what amounts to a "command and control" approach).

For example, a local government cannot freely change zoning classifications in exchange for money, given the planning and police power justifications for zoning. See, e.g., ROBERT H. NELSON, ZONING AND PROPERTY RIGHTS: AN ANALYSIS OF THE AMERICAN SYSTEM OF LAND-USE REGULATION 84 (1977) (noting the incompatibility of the sale of zoning rights with the police power and planning justifications for zoning); William A. Fischel, Equity and Efficiency Aspects of Zoning Reform, 27 PUB. POL'Y 301, 327 (1979) (noting that as long as zoning is justified on police-power grounds, the sale of zoning appears no more permissible than the sale of health and safety licenses). Aesthetic controls in private neighborhoods stand on different footing, as contractually chosen restrictions rather than governmental prerogatives. Altering the entitlement structure of the land use restrictions into which one contracts would seem unobjectionable, even if it meant setting up a system whereby those entitlements could later change hands upon the payment of money.

See Abramowicz, supra note 81, at 429 (observing that "small-scale testing" of different mechanisms could help to avoid jarring system-wide changes).

Relatively little work on entitlement protection has engaged settings that involve a group of individuals interacting over time with respect to a resource held in common. Instead, for purposes of expositional clarity, scholarship in this area has largely employed stylized examples featuring a "polluter" (usually a factory) and a "pollutee" (usually a laundry or homeowner) engaged in one-off litigation. The repeated use of this familiar example has affected the course of scholarship in this area. See Thomas W. Merrill & Henry E. Smith, What Happened to Property in Law and Economics, 111 YALE L.J. 357, 368–71 (2001) (discussing how the focus by Coase and his successors on two-party interactions over entitlements has suppressed attention to the "in rem" character of property); Rose, supra note 7, at 2175–77 (introducing a discussion that explores how
ample therefore advances analysis of these sorts of problems generally and offers some transferable lessons for other commons settings.

The first three sections set the stage for considering the ESSMO. Section II.A illustrates how some of the standard (and not so standard) entitlement choices that have been previously identified in scholarship on property rules and liability rules would operate in the neighborhood setting. Section II.B shows how heterogeneity in subjective valuations complicates the choice of legal entitlement. Section II.C considers the advantages and difficulties associated with relying on sorting to increase homogeneity. Finally, section II.D introduces the ESSMO as a potential substitute for homogeneity achieved through sorting.

A. Entitlements in a Neighborhood Commons

In Figure 6, I use the schema developed by Calabresi and Melamed and their successors to lay out a menu of entitlements for addressing threats to neighborhood ambience. To show how each rule works, I use the example of plastic flamingos — a form of yard art usually thought to generate negative spillovers. Of course, the word "flamingo" could be replaced throughout the table with anything that generates negative externalities within a commons. Consistent with this Article's focus on options, the table highlights the call and put options that different entitlement structures produce. While this menu emphasizes the option structure of liability rules, it does not address the essential question of how the exercise prices for those options are to be determined. This omission is intentional. To appreciate the advantages of ESSMOs and their unique self-assessment feature, it is first necessary to have in mind the available range of option structures that might be used in a commons setting. Hence, we might first envision the put and call options illustrated in Figure 6 as having conventionally set exercise prices that are determined by a third party. After discussing some of the difficulties that accompany efforts to set liability rule prices under fluctuating conditions in a heterogeneous com-

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185 A similarly structured table appears in Ayres, supra note 40, at 798 tbl.3. The flamingo examples in Figure 6 previously appeared in Fennell, supra note 5, at 980 fig. 10, in a table adapted from ones previously generated by other authors, see id. at 979 n.257 (citing antecedent sources).

186 This is not an exhaustive list of all possible entitlement forms. See, e.g., Levmore, supra note 20, at 2173 (listing sixteen remedies discussed in the article); Morris, supra note 8 (identifying fourteen entitlement forms).

187 While both omissions and commissions could cause the neighborhood atmosphere to deteriorate, I will focus here on an aesthetic incursion that happens to represent an affirmative act. In earlier work, I have shown how parallel entitlement option choices exist for acts of commission (like flamingo placement) and acts of omission (like failure to landscape). See Fennell, supra note 5, at 980 fig. 10.
munity, I turn to the special advantages that the ESSMO form can provide.

FIGURE 6. FLAMINGO CONTROL CHOICES

<table>
<thead>
<tr>
<th>Rule</th>
<th>Community Holds</th>
<th>Homeowner Holds</th>
<th>What Does It Mean for Flamingos?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Entitlement Protected by Property Rule</td>
<td>Nothing</td>
<td>Flamingos are forbidden.</td>
</tr>
<tr>
<td>2</td>
<td>Entitlement Subject to a Call Option</td>
<td>Call Option</td>
<td>Flamingos are taxed.</td>
</tr>
<tr>
<td>3</td>
<td>Nothing</td>
<td>Entitlement Protected by Property Rule</td>
<td>Flamingos are permitted.</td>
</tr>
<tr>
<td>4</td>
<td>Call Option</td>
<td>Entitlement Subject to a Call Option</td>
<td>The community can remove the flamingo by paying the homeowner a removal fee.</td>
</tr>
<tr>
<td>5</td>
<td>Less Than Nothing\textsuperscript{188}</td>
<td>Entitlement Plus a Put Option</td>
<td>The homeowner can keep the flamingo or get rid of it and collect a removal fee.</td>
</tr>
<tr>
<td>6</td>
<td>Entitlement Plus a Put Option</td>
<td>Less Than Nothing</td>
<td>The community can demand the flamingo’s removal or collect a flamingo tax.</td>
</tr>
</tbody>
</table>

Under Rule 1, flamingos are banned; the homeowner cannot display her flamingo unless she purchases the right to do so from the community. Under Rule 3, the tables are turned; the homeowner holds the entitlement and may display flamingos to her heart’s content unless she chooses to sell the entitlement at a price she finds fair. The other choices in Figure 6 — calls and puts — allow for unilateral transfers. While any of these calls and puts would be theoretically possible, some of the possibilities seem more plausible or attractive than others. Granting homeowners a “call option” to engage in behav-

\textsuperscript{188} See Ayres, supra note 40, at 799 (explaining that, with puts, “[i]t is possible to have less than zero”). Granting one party the entitlement plus a put leaves the other party with “less than zero” because the latter party not only lacks the entitlement but is also exposed to the possibility of a forced purchase of the entitlement. That liability leaves the party with “less than nothing.” See id.
ior that produces negative externalities by paying a specified price is a familiar possibility. This is precisely what Rule 2's "flamingo tax" does.

Instead of taxing flamingo placement, Rule 5 provides a subsidy to the homeowner who chooses to remove an extant yard flamingo. This approach presents the obvious concern that people would engage in gratuitous flamingo display just to receive the removal subsidy. To guard against endless rounds of displays and subsidy collections, the put option could be more precisely defined as a forced sale not just of the right to engage in a particular instance of flamingo display, but rather of the right to engage in any flamingo display. Nevertheless, attaching a put option to a right to engage in undesirable conduct seems odd, and it remains open to strategic abuse. Put options seem more attractive when used to induce people to engage in socially valuable conduct. For example, offering a subsidy for landscaping amounts to a put option on one's preexisting entitlement not to landscape. If we believe that the "no landscaping" world is an appropriate

189 The fact that it is familiar does not mean it is palatable to everyone, as Judge Jasen's dissent in Boomer v. Atlantic Cement Co., 257 N.E.2d 870 (N.Y. 1970), evidences. Id. at 875–77 (Jasen, J., dissenting).

190 See Saul Levmore, Carrots and Torts, in CHICAGO LECTURES IN LAW AND ECONOMICS 203, 204 (Eric A. Posner ed., 2000) (observing that "for every penalty designed to affect behavior there is a corresponding reward — and for every reward, a corresponding penalty").

191 See Epstein, supra note 16, at 844 (discussing the perverse incentive to pollute under a Rule 5 regime that allows polluters to receive payment when they stop polluting).

192 Cf. Morris, supra note 8, at 854–55 (presenting a gun buy-out program as an example of a put option). The buy-out entirely takes away one's ability to use a gun to perpetrate harm; it does not buy up specific instances of violence. This program might be contrasted, however, with an even broader put (were it enforceable) that would involve giving up the entitlement to hold any gun. When broad entitlements to engage in an activity are the subject of a put, additional questions are raised about the permanence of the reallocation that will be effected by the exercise of the put and the ability of the individual to reacquire the entitlement at a later date. For discussion of a similar point, see infra section II.D.2.

193 See Levmore, supra note 20, at 2165–66 (noting the "startling" nature of such a rule).

194 The potential for abuse depends on the degree to which actors might be able to foresee the possibility of a subsidy for stopping the activity when choosing whether or not to start the activity. This feature accounts for the use of unscheduled "surprise" put options (such as library fine amnesty days on which one can force the library to purchase one's possessory interest in the overdue books for an amount equal to one's outstanding fine liability). Another plausible use involves conditions that cannot be readily or cheaply manipulated in advance (for example, paying special bonuses to longtime employees who agree to take early retirement, where the employees can effectively force a sale of their right to stay on the job). See Fennell, supra note 5, at 987 & n.279 (citing Samuel Issacharoff & Erin Worth Harris, Is Age Discrimination Really Age Discrimination?: The ADEA's Unnatural Solution, 72 N.Y.U. L. REV. 780, 814–15 & n.176 (1997)).

195 Even then, we must be wary of unintended effects. See Levmore, supra note 190, at 208 (presenting an example in which granting rewards to drivers found wearing seatbelts could increase the incentive to drive around with seatbelts on and thereby perversely increase the number of accidents).
baseline, the worries about perverse incentives are minimized, although perhaps not entirely eliminated.

As Figure 6 indicates, it is also possible to grant call and put options to the community rather than to the individual homeowner. Rule 4 gives the community a call option to buy up the homeowner's right to engage in a particular behavior for a specified fee. Like Rule 5, this rule could induce gratuitous flamingo display aimed at attracting payments. Unlike Rule 5, however, Rule 4 leaves the choice of whether or not to exercise the option with the community. If the community suspected that a particular homeowner was displaying flamingos solely to annoy the community into buying up her flamingo rights, the community could call the homeowner's bluff by refusing to respond.

Finally, the community could hold a put option that offers it a choice between banning the behavior and collecting a fee for letting the behavior continue (Rule 6). In effect, the community would be given a choice between damages and injunctive relief. One concern with this rule is that the choice of injunctive relief might not actually reflect a preference for that sort of relief. It might instead represent a desire to hold out for higher damages. Additionally, Rule 6 becomes incoherent when applied to periodic damages associated with ongoing and future violations. As Richard Epstein observes, no legal system allows a plaintiff to force a polluter to keep on polluting for a price when that polluter would prefer to cease polluting.

The plain building blocks in Figure 6 can be combined to produce more elaborate varieties. Recent work building on The Cathedral has examined pairing rules together, so that each of the two parties gets a choice between two alternatives. To return to the flamingo exam-

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196 This would depend in part on whether everyone is already landscaping. If so, punishing the few non-landscapers might be administratively easier than rewarding all the landscapers. See id. at 206-07 (explaining that administrative costs can be reduced by focusing on the smaller of two possible target groups). The choice of the appropriate baseline also implicates the unstable distinction between harm avoidance and benefit creation. See Frank I. Michelman, Property, Utility, and Fairness: Comments on the Ethical Foundations of "Just Compensation" Law, 80 HARV. L. REV. 1165, 1196-1200 (1967) (discussing the difficulty, in the context of regulatory takings, of distinguishing harm-producing actions from actions that fail to confer benefits).

197 The subsidy might be viewed as "crowding out" internally motivated decisions not to exercise the "no landscaping" entitlement (that is, decisions to voluntarily landscape). Cf. Bruno S. Frey & Felix Oberholzer-Gee, The Cost of Price Incentives: An Empirical Analysis of Motivation Crowding-Out, 87 AM. ECON. REV. 746 (1997) (studying the possibility that compensation would crowd out civic-mindedness in the context of siting noxious facilities).

198 Richard Epstein suggests that Rule 6 is not a distinct rule, but rather an articulation of a properly formulated Rule 1. See Epstein, supra note 16, at 842.

199 See Ayres & Madison, supra note 151, at 47-50 (discussing the possibility that parties will strategically seek injunctions).

200 Epstein, supra note 16, at 843.

201 See, e.g., Avraham, supra note 8; Ayres & Goldbart, supra note 8.
ple, both the community and the individual could confront a choice between having the individual pay a tax (and keep the flamingo) and having the individual get rid of the flamingo (but pay no tax). If both choose the tax, then the tax is paid, and the flamingo stays. But if either party wants to get rid of the flamingo, then it is removed, and no tax is paid.202 An alternative combination would allow the transfer of the entitlement at the exercise price if either party desired it.203

Another way to offer choices to both parties is to provide for successive rounds of call options.204 For example, Rules 2 and 4 could be combined so that both parties hold calls to regain the entitlement from the other.205 My notion of a customized callable call, which is discussed below in section II.D, builds on this basic model by adding the element of self-assessed valuation.

B. The Trouble with Heterogeneity

If everyone had identical, durable, and transparent preferences about flamingos, a simple and efficient choice could be made between Rule 1 and Rule 3. But heterogeneous, unknown subjective valuations of the flamingo entitlement complicate matters. Section II.B.1 pins down precisely what heterogeneity means in this context, and section II.B.2 shows how opaque subjective valuations in a heterogeneous community confound simple entitlement solutions.

1. Charting Heterogeneous Preferences. — To begin, imagine that we have a community made up of people who potentially split into three different camps on two different dimensions, as shown in Figure 7.206

202 See Avraham, supra note 8, at 278-82 (describing "modular liability rules" that would extend a choice to both parties); Ayres & Goldbart, supra note 8, at 9-10 (discussing "dual-chooser" rules).

203 See Ayres & Goldbart, supra note 8, at 10. In the flamingo context, this possibility seems unrealistic. It would mean that a tax would be paid and the flamingo displayed if either the individual or the community desired that result. While it is easy to imagine letting a resident elect to display and pay, it is hard to imagine letting a community force the resident to display and pay. See Epstein, supra note 16, at 843. Presumably, the resident would always have the choice to stop displaying and stop paying — a result consistent with a garden-variety Rule 2 regime.

204 See sources cited supra note 32.

205 See, e.g., Ayres & Balkin, supra note 24, at 714-16 (discussing "higher-order liability rules with reciprocal taking" options); Ellickson, supra note 12, at 738-48 (describing the possibility that a plaintiff could be given a choice between damages and a "compensated injunction").

206 As I explain in note 207, some of the resulting combinations are mutually exclusive.
Figure 7. Heterogeneity in Flamingo Preferences

<table>
<thead>
<tr>
<th>Benefit of Own</th>
<th>No Benefit</th>
<th>Low Benefit</th>
<th>High Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Others’</td>
<td>I. No Benefit, No Cost</td>
<td>II. Low Benefit, No Cost</td>
<td>III. High Benefit, No Cost</td>
</tr>
<tr>
<td>No Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Cost</td>
<td>IV. No Benefit, Low Cost</td>
<td>V. Low Benefit, Low Cost</td>
<td>VI. High Benefit, Low Cost</td>
</tr>
<tr>
<td>High Cost</td>
<td>VII. No Benefit, High Cost</td>
<td>VIII. Low Benefit, High Cost</td>
<td>IX. High Benefit, High Cost</td>
</tr>
</tbody>
</table>

One dimension on which people vary is their private subjective valuations of their own entitlements — here, the entitlement to place flamingos. The three columns represent three possible valuations of the flamingo entitlement. People in the leftmost column gain no net benefit from their own flamingo placement. People in the middle column enjoy benefits of personal flamingo placement that exceed their internalized shares of the costs associated with that placement, but derive less benefit from personal flamingo placement than it costs the community as a whole. The rightmost column represents people who value their own flamingo placement to an extent that exceeds the costs it imposes on the whole community. In other words, the flamingo placement carried on by people in the middle column is inefficient, while the flamingo placement undertaken by those in the right column is efficient. The people in the left column have no a priori reason to place flamingos at all since they derive no benefit from this activity, although they might do so strategically under some imaginable entitlement regimes.

The second dimension on which individuals vary is the degree to which they are harmed by other people’s exercise of entitlements (or the degree to which they would value having an entitlement to prevent that exercise). The top row in Figure 7 represents people who are not bothered at all by the flamingo placement of others; the middle row represents people who are bothered somewhat by the flamingo placement of others (but not enough to do anything about it on their own); and the bottom row represents people who are so bothered by the flamingo placement of others that they would be willing to pay the full
amount it would cost to buy up everyone else's flamingo placement rights.\textsuperscript{207}

It is helpful to consider some possible ways in which the population of a community might map onto this preference chart. While one might initially think that conflicts are necessarily the product of divergent preferences, this is not always the case. In fact, the standard tragedy of the commons story features people who all have the preferences depicted in Cell V. Cell V people do not highly value flamingo placement — each individual in this cell gleans only a little more benefit than her internalized share of the cost. Yet these individuals will display flamingos because the benefit they derive exceeds their internalized shares of the cost. At the same time, Cell V people can suffer from the flamingo placement of others. If the aggregate harm suffered by the community exceeds the internalized benefits of its members, Cell V people will put out more flamingos than is efficient. They are locked in a Prisoner's Dilemma in which their best strategy is to "defect" by putting out flamingos of their own, no matter what everyone else does.\textsuperscript{208}

However, not all possible preference combinations carry the makings of tragedy. For example, nobody in the top row (Cells I, II, and III) suffers any harm from the flamingos of others. If everyone in a given community had preferences corresponding to one of these three cells, then there would be nothing tragic about the proliferation of flamingos that resulted — assuming the community is self-contained, and that there are no spillovers on outsiders or on nonhuman organisms within the community. Similarly, nobody in the left-hand column (Cells I, IV, and VII) has any desire to place flamingos in their yards. If everyone in a given community had preferences corresponding to one of these cells, then there would be no flamingos and no tragedy either.

2. \textit{Addressing Tragedy Under Conditions of Heterogeneity.} — If we assume a core of Cell V people, and we start in a Rule 3 world (flamingos are permitted through a property rule), then the stage is set for

\textsuperscript{207} Not all of the cells shown in Figure 7 can be occupied simultaneously. For example, if someone occupies Cell IX, nobody can occupy Cells III or VI because nobody would then enjoy a benefit so great that she could compensate everyone else for their harm. Specifically, nobody would be able to compensate the person in Cell IX, who by definition is harmed by the flamingos of others so much that she would be willing to pay the reservation prices of everyone else. Similar logic constrains a variety of other combinations. Also, as a matter of logic, only one individual (at most) can occupy Cell IX. This occupant is someone who so highly regards her own flamingo rights that she would be willing to pay everyone else a sufficient amount to compensate them for the costs they incur, but so detests everyone else's flamingos that she would also be willing to pay everyone in the community their reservation price for their flamingo rights.

\textsuperscript{208} For discussions of the Prisoner's Dilemma, see, for example, \textsc{Douglas G. Baird et al., Game Theory and the Law} 33 (1994); and \textsc{Charles J. Goetz, Law and Economics} 8–17 (1984).
tragedy unless some action is taken. A common response would be simply to ban flamingos — that is, to move to a Rule 1 regime, in which the community holds the flamingo rights and can prevent anyone from placing flamingos. That would be a fine solution if everyone really occupied Cell V. However, this may not be the case — or it may cease to be the case over time. If there are high flamingo valuers in the group (people in Cells III, VI, or IX), the ban will operate inefficiently as to them. It will keep them from engaging in an activity that generates more benefits than harms, even when all of the externalized harms are counted.

While it is true in theory that a high valuer could try to buy back flamingo rights from the community, this result will likely be difficult or impossible to achieve in practice. Significantly, obtaining an entitlement from “the community” in a private neighborhood setting means reassembling rights that were previously alienated to dozens, hundreds, or even thousands of neighbors through a web of reciprocal covenants.209 Such a homeowner’s inability to reassemble the right to display a flamingo presents a tragedy of the anticommons.210 Hence, replacing a yard-art entitlement held by the homeowner and protected with a property rule (Rule 3) with the opposite arrangement, a property-rule-protected entitlement that gives vetoes to all other members of the community (Rule 1), replaces one potential tragedy with another.211

The drawbacks associated with both sorts of property rules raise the possibility of experimenting with other kinds of entitlement schemes. Could we do better with some form of call or put option arrangement? Such a solution would avoid the risk of bargaining impasse and would provide, in theory, a way to test whether the individual or the community places a higher value on the flamingo entitlement. But setting the exercise price correctly is difficult. As has been well noted, technical problems arise when there are varying marginal impacts associated with each unit of externality-producing behavior.212 The subjective amount of harm a given flamingo display

209 See Fennell, Contracting Communities, supra note 36, at 846 fig.2 and accompanying text. It is true that the high-valuer could also try to agitate for change through the homeowners’ association’s political process. However, if her appreciation for flamingos is unusual in her community, this effort is unlikely to be successful, since changes in land use restrictions typically would be made (or not made) on a community-wide basis.


211 The interplay between these two tragedies is explored at length in Fennell, supra note 5. See, e.g., id. at 971–89 (discussing factors, such as differences in the production functions of potential tragedies, that could provide help in choosing wisely between them).

212 See, e.g., Gideon Parchomovsky & Peter Siegelman, Selling Mayberry: Communities and Individuals in Law and Economics, 92 CAL. L. REV. 75, 93 n.74 (2004) (observing that "[t]he ef-
causes is not only unknown, but may also fluctuate depending on exactly when and where the flamingo is displayed, how many other flamingos are already on display nearby, and the like. For example, particularly damaging flamingo “hot spots” could develop. Or, after some critical mass of flamingos exists in the neighborhood, people might become numbed to the sight of them so that they would not suffer additional marginal impacts as more are added. Heterogeneity among individuals in the amount of harm suffered complicates things further.

Another problem has already been alluded to above: people’s preferences may change over time. Thus, even if it were possible to set up a system of fees that accurately reflected harms at time $T_1$, the system might not continue to do so at time $T_2$. Even though a call option mechanism allows a homeowner to unilaterally gain a flamingo display entitlement when her valuation moves above the call option’s exercise price, the prices themselves may fail to align with the harm that the community will suffer. Suppose, for example, that flamingos come to represent a particular ideology that many people in the community find repugnant, or that aberrant weather patterns remove vegetation that had previously created a buffer between the flamingos and their unwilling viewers. These sorts of changes alter the damage level that each flamingo causes.

Ideally, we would develop a method of updating prices based on the actual, evolving preferences of the community members. But how can this be accomplished? One possibility would be for the community to reconvene periodically and reset the liability rule price based on an updated average harm per flamingo. Although this procedure would not address the technical problems that exist when different units of harm produce nonfungible results, it would represent an improvement over continuing indefinitely with an outdated exercise price. In doing even that much, however, the community faces difficulties in aggregating the interests of its members.

**C. Seeking Homogeneity**

The conventional response to the problem posed above is to suggest that people sort themselves into same-taste communities. Indeed,
one of the principal advantages claimed on behalf of common interest
communities is their ability to offer a customized living experience
based on common tastes and interests. Homogeneity not only simpli-
ifies entitlement choice, it also creates favorable conditions for the de-
development and enforcement of social norms. But there are some limits
to this approach, and some concerns presented by the sorting that is
necessary to produce and maintain homogeneity.

1. The Power and Limits of Sorting. — Suppose that there are two
communities, one (call it "Pinkland") that allows flamingos, and an-
other ("Vanillaville") that prohibits flamingos, backing up that prohibi-
tion with injunctive relief. In other words, individuals must choose
between two different "property rule" regimes: one in which the com-
munity holds the entitlement to forcibly keep flamingos out, and the
other in which the individual holds the entitlement and can display
flamingos at will. How will people with the various preferences de-
picted in Figure 7 sort themselves into these communities?

The left-column people can live happily in Vanillaville; none of
them will be tempted to display a flamingo. Likewise, the top-row
people are indifferent to the flamingos of others and can live happily in
Pinkland. So far, so good. We might initially expect the people in the
rightmost column — the high-valuers of flamingo display — to flock
(so to speak) to Pinkland. We might also expect those in the bottom
row, for whom the flamingo display of others is tremendously costly, to
move to Vanillaville. Yet we already can see a point of conflict —
which way will someone in Cell IX go? She will not be happy in
Pinkland, so bothered is she by the flamingos of others. She would
prefer to live in Vanillaville if only an exception could be made for her
flamingo. The same goes for those in Cells V, VI, and VIII, who also
get a positive benefit out of displaying flamingos, but suffer from other
people’s yard art.

Because of the possibility that some people will prefer to live in a
"flamingo-free except for my flamingo" community, sorting cannot be
automatically self-sustaining. In other words, the world does not
break cleanly into those who love yard art and those who hate it, so
that people can simply retire to their respective communities and live
happily ever after. Indeed, as I have noted elsewhere, an adverse se-
lection problem may arise from the interaction of multiple communi-
ties in the same metropolitan area.\(^\text{215}\) For example, if we have fifty
versions of Vanillaville and one Pinkland in a metro area, the concen-
tration of flamingos and other offensive yard art may make Pinkland

\(^{215}\) See Fennell, Contracting Communities, supra note 36, at 864–67.
quite undesirable — even to people who like to display their own yard art and do not mind an occasional flamingo here and there. People would much rather stay in "normal" communities and make small exceptions to the rules for themselves. Thus, enforcement and monitoring will be required to keep Vanillaville flamingo-free.

This is not a unique or insurmountable objection, of course. Any system of legal entitlements requires some enforcement, and the homeowners’ association provides a centralized enforcement mechanism capable of overcoming the collective action problems that would otherwise render enforcement difficult. As long as those parties for whom flamingo placement is efficient are in Pinkland and those for whom flamingo placement is inefficient are in Vanillaville, the respective property rule entitlement regimes of these two communities will produce no inefficient results. We need not grapple with exercise prices or with complex entitlement schemes; property rules will do.

Unfortunately, there is reason to doubt that this will work as smoothly as advertised. First, if people are making decisions based on a multitude of factors, they will not be free to “vote with their feet” as to the flamingo issue alone; they will instead be making a bundled choice. When confronted with a complex decision like buying a home, people tend to focus on just a few key characteristics in order to make the decision process tractable. Deed restrictions may be neglected in the heuristics they employ.

Second, preferences are notoriously mutable. If preferences change over time, a rule may forbid what has become an efficient activity. If the rule cannot be changed, it will either generate an inefficient result, or it will prompt the individual to move elsewhere. While it is difficult to imagine anyone moving over the right to flamingo display, other controls on property use (such as forbidding pets, people below a certain age, or certain kinds of vehicles) could infringe sufficiently on one’s quality of life to trigger a departure. Moving for such reasons —


217 See Korobkin, supra note 150, at 1227–29 (presenting evidence that suggests homebuyers have difficulty incorporating large numbers of attributes into decisionmaking).


219 The Fair Housing Act prohibits private housing discrimination based on the presence of minor children, but this prohibition is subject to an exception for housing for older residents. See 42 U.S.C.A. §§ 3604, 3607(b) (2003).
and the prospect of having to do so—imposes both individual and social costs. In moving, people are always forced to forfeit their entire subjective surplus in their homes; they will not be able to command more than fair market value. The prospect of losing this surplus diminishes the incentive to do the sorts of valuable things—like invest in relationships within a particular community—that develop the surplus.

Indeed, there is an interesting and insufficiently acknowledged tension between two factors that can ease life in a community—homogeneity of preferences and stability of community membership.\(^\text{220}\) The former facilitates the application of simple legal rules to the group, while the latter fosters the kinds of interactions that would make legal rules less necessary. Even if sorting could help us to achieve homogeneity in the short run, re-sorting would be necessary on an ongoing basis to maintain homogeneity in the face of changing preferences as people move through the life cycle. Thus, instead of merely relying on sorting to create homogeneous populations, we should also consider ways to make heterogeneous populations more functional through the structuring of entitlements.

Before discussing how ESSMOs offer an alternative to the homogeneity that can be achieved through sorting and re-sorting, it is necessary to say a bit more about the role of social norms in private neighborhoods and their relationship to homogeneity and sorting.

2. Social Norms. — De facto entitlements, such as those created through social norms, play an important role in regulating actions in the neighborhood commons.\(^\text{221}\) For example, a norm might discourage making noise above a certain level after 11 p.m. Alternatively, a norm might reward certain behaviors, like keeping one’s lawn neatly trimmed in a suburban neighborhood. In this way, norms can cause actors to partially or wholly internalize the externalities associated with their actions.

The group’s norms can be understood as endowing the collectivity with an entitlement protected by a liability rule. The exercise price is the psychic or social costs associated with violating a norm. Interest-

\(^\text{220}\) See Jane Jacobs, The Death and Life of Great American Cities 139–40 (1961) (noting how the quest for homogeneity in housing types contributes to neighborhood instability).

\(^\text{221}\) See, e.g., Edella Schlager & Elinor Ostrom, Property-Rights Regimes and Coastal Fisheries: An Empirical Analysis, in The Political Economy of Customs and Culture: Informal Solutions to the Commons Problem 13, 19–21 (Terry L. Anderson & Randy T. Simmons eds., 1993) (discussing de jure and de facto rights to common property). Another source of de facto entitlements arises out of the political process. In the case of land uses controlled by zoning, the political clout of interested neighbors or moneyed interests may play an important role in determining whether a particular use is permitted or banned. In the smaller-scale political realm of a homeowners’ association, de facto entitlements may inure to the benefit of the most troublesome, vocal, or popular portions of the community.
ingly, in a norms-based system, the “exercise price” can be finely cali-
ibrated to match the externalities involved without the need for any
special schedules or calculations; the level of social opprobrium simply
rises with the costs inflicted, just as the level of approbation rises with
the benefits bestowed.\textsuperscript{222} It is also possible that group members, or
some subset of them, will hold the equivalent of “property” entitle-
ments — the ability to keep any member from taking a particular ac-
tion without their consent or permission, whether tacit or explicit.

Law strongly influences two compositional factors that are likely to
be important in the development and effectiveness of norms as a
means of spillover control. The first is the law’s impact on community
homogeneity. The more homogeneous a community is, the more likely
it is that the interests of its members will be in alignment, and the
simpler it is to formulate efficient rules. For example, relatively ho-
mogogeneous parties who interact repeatedly might rationally choose a
legal regime that fails to protect against certain classes of common-
place intrusions that are suffered and inflicted reciprocally by each of
them over time.\textsuperscript{223} Indeed, norms could cause these parties to embrace
a “live-and-let-live” approach even if legal recourse were actually
available for some of these intrusions.\textsuperscript{224} Far from “standing on their
rights,” the parties may willingly give up some of them in exchange for
a reciprocal concession from the other community members.

The fact that the parties expect to “swap roles” over time produces
this result. For example, the ranchers that Robert Ellickson studied in
Shasta County, California, were at times victims of damage caused by
livestock and were at other times responsible for damage to others
caused by their own livestock.\textsuperscript{225} A policy addressing minor animal
trespasses establishes a payoff for the trespasser and a complementary
payoff for the trespassee. A party who will be alternating between re-
ceiving “the trespasser’s payoff” and “the trespassee’s payoff” will
choose a policy that maximizes the sum of these two payoffs.\textsuperscript{226} When
administrative costs are factored in, ignoring minor trespasses may of-
ferr the best outcome.\textsuperscript{227} Informal social norms built around the reality

\textsuperscript{222} See Richard H. Pildes, The Destruction of Social Capital Through Law, 144 U. PA. L. REV.
2055, 2073 (1996) (observing that the “subtlety of [norm] enforcement mechanisms enables highly
nuanced distinctions between types of violations”).

\textsuperscript{223} See, e.g., Epstein, supra note 16, at 838–39.

\textsuperscript{224} See ELLICKSON, supra note 102, at 52–55 (observing that the “live-and-let-live” system
prevailed in Shasta County without apparent regard for the background legal rules).

\textsuperscript{225} See id. at 54 (observing that “most residents expect to be on both the giving and the receiv-
ing ends of trespass incidents”).

\textsuperscript{226} This mechanism solves the problem of private valuations by effectively exposing each indi-
vidual to both of the complementary payoffs she creates in supporting a particular trespass rule.

\textsuperscript{227} See ELLICKSON, supra note 102, at 54 (noting that “[i]f trespass risks are symmetrical, and
if victims bear all trespass losses, accounts balance in the long run”).
of role rotation can help ensure that burdening conduct is roughly reciprocal in incidence and commensurate in scale.\textsuperscript{228}

Heterogeneity introduces a difficulty for systems that are premised on role rotation, however. For example, a vegetarian neighbor with many gardens but no livestock may object to the rule that trespass victims must bear their own losses, since she will never be in the role of a trespasser herself. The conventional wisdom thus urges community homogeneity not only because it makes legal entitlements easier to formulate, but also because it makes legal entitlements less necessary by maximizing the norm-building and reciprocal tendencies of communities.

The second factor that law can influence is the stability of the neighborhood grouping. Cooperation is more likely in settings featuring repeat play,\textsuperscript{229} and neighborhoods provide an ideal context for gleaning the fruits of sustained, stable interactions. As noted above, however, fostering stability can be in some tension with fostering homogeneity. A frequent response to complaints about private land use controls is that anyone who is made too unhappy by a given restriction can simply move away. But homeowners build up site- and network-specific capital over time, making an exit strategy individually and socially costly.

Because of interdependencies, each such exit will impose externalities on those left behind by depriving the community of one of its members and reducing the overall stability of the group.\textsuperscript{230} In addition, an ethic of exit could lead existing residents to reduce their investments in the neighborhood.\textsuperscript{231} Hence, a set of legal entitlements that depends heavily on exit to rectify problems will not be well-designed to encourage the kinds of neighborhood-specific investments that are likely to produce important positive societal spillovers.\textsuperscript{232}

\textsuperscript{228} See id. at 55–56 (discussing the “rough mental account[s]” that Shasta County residents keep and the “live-and-let-live norm” that permits small imbalances).

\textsuperscript{229} See Claudia Keser & Frans van Winden, Conditional Cooperation and Voluntary Contributions to Public Goods, 102 SCANDINAVIAN J. ECON. 23, 31–33 (2000) (presenting empirical work showing increased cooperation in settings where repeated interactions were expected).

\textsuperscript{230} See, e.g., NEIL K. KOMESAR, LAW'S LIMITS: THE RULE OF LAW AND THE SUPPLY AND DEMAND OF RIGHTS 147 (2001) (noting that the exit mechanism is based on “competition not cooperation” and that a tension exists “between mobility and stability”); Parchomovsky & Siegelman, supra note 212, at 114–24 (discussing “community externalities” that residents do not take into account in deciding whether to exit).

\textsuperscript{231} Indeed, the enforcement of social norms is itself the sort of investment that community members may tend to neglect if they expect to move soon. I thank Tom Ginsburg for this point.

\textsuperscript{232} One possibility would be to directly subsidize the investments made in the community, or perhaps more workably, provide bonuses for each year spent in the community. Cf. Ellickson, supra note 12, at 736–37 (suggesting damage adjustments that would take into account normal increases in the subjective valuation of one's home corresponding to longevity in the neighborhood); Parchomovsky & Siegelman, supra note 212, at 139–42 (suggesting that a “community
D. The Case for Option Making

In this section, I describe how option making provides a way of addressing the problem of aesthetic spillovers in a heterogeneous neighborhood. The mechanism I describe takes into account the special features of the commons setting, and is designed to integrate both sorting and social norms. Section II.D.1 describes how a community-wide schedule of liability rules could address, at the "wholesale" level, some of the difficulties that communities have encountered in controlling aesthetics. Section II.D.2 adds the idea of a customized callable call that would allow for further fine-tuning on an individual basis. In section II.D.3, I use the neighborhood example to explore two broader concerns that relate to ESSMOs — strategic behavior and distributive justice.

1. Wholesale Option Making: Liability Rule Schedules. — One idea for incorporating ESSMOs into private neighborhoods builds on the potential for self-sorting inherent in the private neighborhood form. Unlike a traditional neighborhood that grows over time, the private development is conceived all at once by the central figure of the developer. Proponents of such private communities emphasize the ability of these communities to offer a diverse array of customized living experiences. So far, such product differentiation has occurred primarily in the substance of land use restrictions. There has been little variation among communities in the entitlement structure itself — a dimension along which sorting might also usefully occur.

For example, instead of simply prohibiting certain uses by covenant, the governing documents could establish a liability rule regime, complete with a price list of fees for particular violations. In other words, the community (with the developer acting as its agent) could pair the land use restrictions imposed as a condition of entry into the community with options extended to homeowners. The community in this situation would effectively hold an ESSMO.

Such an approach serves two purposes. First, it promises to increase the homogeneity of the group with regard to the items on the list by encouraging self-sorting along remedial as well as substantive

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233 This is structurally analogous to an idea explored by Robert Merges in the context of intellectual property rights — the idea of "contracting into" a liability rule regime from a position of property rule protection. See Merges, supra note 136, at 1303 (discussing the possibility that intellectual property organizations could develop menus of terms for their members). In this case, the homebuyers would presumably begin with background rights corresponding to Rule 3 (control over their own activities with mild spillovers), which they would then voluntarily alienate by entering a regime in which spillover-causing activities would be taxed and subsidized in the manner indicated. I previously mentioned the possibility of such a price list in Fennell, Contracting Communities, supra note 36, at 892 & n.269, but did not develop the idea at length.
Price lists could help prospective buyers sort themselves in a more meaningful way than is possible when every community the homebuyer encounters features a fairly similar laundry list of prohibitions. For example, a homebuyer could meaningfully distinguish between two different neighborhoods that disfavor flamingos if one charges a flamingo tax of one hundred dollars per day and the other charges a tax of ten dollars per year. People might be inclined to pay more attention to lists of prices than to lists of prohibitions, especially if the background expectations that they bring with them to the home-purchasing context make them disbelieve that absolute prohibitions would really be enforced.

Second, the ESSMO approach reduces the risk that a given community member will be prevented from engaging in an activity that is efficient, or that later becomes efficient. The price list quite literally gives homeowners options. The initial sorting based on prices will be imperfect, both because people are making bounded decisions about bundled goods and because preferences will change over time. But if preference swings are drastic enough, then people will find it worthwhile to pay the price and engage in the activity in question. Thus, homeowners in such a regime hold an option that is not available to people living under prohibitions backed by injunctive relief. Where the fees for engaging in desired behaviors are lower than the cost of exiting the community altogether for a given individual, that person is better off in a neighborhood with a fee schedule than in a neighborhood with flat prohibitions. Moreover, given the spillover effects associated with long-term residency, the neighborhood is also better off.

There is a wrinkle, though, that requires some discussion. The earlier analysis emphasized mandatory option making. Am I suggesting that the developer be required to offer covenanting homeowners a price list, rather than merely a list of prohibitions? The idea seems problematic for two reasons. First, it seems wrong to rule out the possibility of strong property rule protection, backed by injunctive relief, if that is what the bargaining parties agree upon. Second, it seems futile to tell a developer that she must issue a price list if she and her customers really want a prohibition. What will stop her from simply

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234 I am assuming here that increased homogeneity is desirable insofar as it helps the community achieve its collective goals. To the extent that increased homogeneity within the community inflicts costs on those outside of the community or damages society as a whole, the analysis would obviously change.

235 See, e.g., James L. Winokur, Choice, Consent, and Citizenship in Common Interest Communities, in Common Interest Communities: Private Governments and the Public Interest 100-01 (Stephen E. Barton & Carol J. Silverman eds., 1994) (discussing the possibility that homebuyers enter common interest communities with the expectation that difficulties can be amicably worked out with their neighbors). Of course, if people simply ignore deed restrictions altogether, the price list would not be helpful in prompting useful sorting.
filling in a ludicrously high amount, say $100 million for each violation? These two objections are, in fact, closely related. Answering these objections requires examining in more detail the meaning of the exercise price to the homeowner.

At one level, we would expect the homeowner to have the same attitude toward exercise prices as any other option holder. The lower the exercise price for the homeowner’s option, the more valuable that option should be to her, holding other things equal. But other things are not equal. The homeowner is also a member of a community that holds an ESSMO, the value of which is reduced as the exercise price on each homeowner’s option drops. Thus, each homeowner should prefer an exercise price that maximizes the sum of two things: the value of her option, and the benefits she enjoys as a function of the community’s ESSMO.

Homeowners might or might not find that the value of the option outweighs the effects of downgrading the community’s entitlement from a property rule to an ESSMO — this is an empirical question. If a homeowner found option holding valuable within some range, then the option’s exercise price and the homeowner’s willingness to pay for a home bundled with that option would be negatively correlated within that range. But if homeowner options are not, on balance, valuable within any range — or if, indeed, they always subtract value — then raising the exercise price to infinity would have either no effect or a positive effect on home prices in the community.

Recognizing this point suggests that we might turn the two objections around: Why not require developers to engage in option making, as long as we leave them the choice of issuing options that will never be “in the money” for any of the community residents? If this is really what residents want, they will happily pay top dollar for an unbearably high liability rule price; they will thus be able to achieve protection for the land use restrictions that is indistinguishable from that produced by property rules. But if it is not what they really want, they will demand compensation for high liability rules in the form of lower home prices, which will quickly lead developers to adjust their exercise prices downward.

At this point in the argument, the reader may protest that if people wanted options of this sort in private communities, they would already have them; it is, after all, the job of developers to give people what they want. But innovation in entitlement design is costly and risky,

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236 See Kaplow & Shavell, supra note 8, at 724 (observing that “a liability rule with very high damages is equivalent to property rule protection of victims”).

237 See, e.g., Yoram Barzel, Economic Analysis of Property Rights 115 (2d ed. 1997) (observing that developers presumably add restrictions because they predict doing so will increase value for buyers, and hence their own profits); Ellickson, supra note 12, at 713 (suggest-
and a developer who innovates must bear all of the costs and risks alone. It is safer and more lucrative for developers to let others bear the costs and risks of innovation, and then copy successful models and forms that have already met the approval of regulators and lenders. Therefore, we cannot tell whether prevailing arrangements reflect the marketplace's judgment on the merits or merely the influence of path dependence and inertia.

Requiring developers to offer options would provide one way of starting to test this question — we could see whether the selected exercise prices lined up with property rule protection, or whether they looked more like meaningful options that could be in the money for some subset of residents. However, there are two problems that prevent required "wholesale" option making from being a meaningful test of the demand for entitlement innovation. First, many homebuyers ignore covenants and other governing documents altogether, choosing a home based on other attributes like price and location. The concern here is that the market might not provide useful signals to developers about consumers' preferred pricing for violations of land use restrictions.

Second, the simple ESSMO regime I have described deals very well with fluctuations in homeowners' valuations of the right to engage in specified conduct, but it does not address fluctuations in the amount of damage that such conduct causes. Hence, this system introduces great uncertainty for individual homebuyers and for the community at large. What if the violation in question were something truly hideous — say, a forty-foot flamingo covered in glitter? And what if it were right next door? Homeowners are an especially risk-averse group when it comes to their most significant investment. They are likely to value the certainty of having the power to banish an eyesore from

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239 The influence of regulators and lenders also suggests that the resulting pattern of covenants is not entirely consumer-driven.

240 For additional discussion of these points, see Fennell, Contracting Communities, supra note 36, at 851, 867-69, 895.

241 As Ayres points out, it makes sense to assign an option to the party with the "higher variance of potential values." Ayres, supra note 40, at 819. In this case, the community's valuation is likely to be just as variable as that of the individual homeowner. The price list could be indexed to keep pace with inflation and updated annually within some designated bounds, but this would not deal with problems like flamingo hot spots or a new social meaning of flamingos. See supra p. 1454.

their street. To address some of the negative effects of uncertainty, consider the following way of fine-tuning ESSMOs at the individual or "retail" level.

2. Retail Option Making: The Customized Callable Call. — We might add the following twist to the liability rule regime described in the preceding section: the call options created by the price list and granted to the homeowners would themselves be callable by the community. Moreover, that callable feature would be "customizable" by the homeowner. This mechanism is best illustrated with an example.

Suppose a developer wishes to erect a private community somewhere between Vanillaville and Pinkland — call it Middletown. Aesthetic controls seem to be much on the minds of the consuming public, yet the developer intuitions (after reading several law review articles) that there may be an untapped market for a community willing to tolerate some aesthetic diversity — as long as things do not become too tacky overall. What to do? First, the developer considers a simple (Rule 2) call option that would attach an annual fee of, say, fifty dollars to yard art display. This option would divide the population into those who valued flamingo display at over fifty dollars and those who valued it at under fifty dollars. The former would display a flamingo and pay the fee, and the latter would not display a flamingo and would avoid the fee.

Prospective homebuyers might be concerned about this solution, however. Because it may be impossible to predict ex ante how many people will value flamingo display at a particular level, the risk exists that the community might, over time, suffer from an overabundance of flamingos.\(^{243}\) Homebuyers might also fear excessive spatial concentrations of flamingos (akin to effluent "hot spots") or particularly egregious examples of flamingo display (the forty-foot, glitter-covered flamingo). In short, they may fear what might happen if they simply allow flamingo aficionados to "display and pay."

An alternative that would leave greater control with the community (and hence provide greater protection to homebuyers) would be to proceed with the fifty-dollar flamingo fee, but add a "callable" feature that could be exercised at will by the community. The callable feature would enable the community to re-acquire any individual’s flamingo-display permit upon payment of an exercise price. The exercise price for the community’s call option would be reset at preannounced intervals and would be made up of two elements: a default component and a customizable component. The default component would simply be

\(^{243}\) Issuing a limited number of tradable flamingo permits would control overall quantity, but would not solve other difficulties, such as those connected to the nonfungibilities among kinds of flamingos and issues relating to the physical distribution of flamingos through the community. Cf. pp. 1474–75 and sources cited infra notes 270–272 (discussing "hot spots").
the community's standard flamingo fee (here, fifty dollars). If the homeowner did nothing to "customize" her option to place a flamingo, the community could call back her flamingo entitlement at any time by simply refunding her standard fee.

The individual could, however, choose to customize the exercise price at which the community could buy back her flamingo entitlement. She could raise the community's price of recalling her flamingo permit by paying, in addition to the fifty-dollar minimum flamingo fee, an extra premium (which she could adjust from year to year). This premium would raise the exercise price for the community, in that the community would have to refund it along with the standard tax in the event of a flamingo recall. The flamingo fees and premiums would go into the central coffers of the homeowners' association to be used for administering the system; any excess would go toward providing benefits to the community at large. Amounts could, of course, be kept in reserve to fund later buybacks, but they would not have to be set aside for that purpose. Any buyback undertaken by the community would reduce the amount of money available to the homeowners' association to spend for other purposes.

If the community decides that it has become too flamingo-heavy, it can begin exercising its own call options to "call in" outstanding homeowner call options. If the problem were the overall level of flamingos, then it could simply start by looking for the flamingos that could be recalled at the lowest exercise price. If there were troublesome spatial concentrations, the community could scan the concentrated area for the cheapest recall options. Individuals who highly valued flamingo keeping could immunize their call options against being "called" by raising the exercise price to a high level and paying a correspondingly high flamingo fee.

The callable call thus pairs the Rule 2 entitlement regime (display and pay) with a Rule 4 entitlement regime (flamingo recall upon pay-

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244 I am suggesting here that the premiums raise the exercise price for the community's "call back" option on a dollar-for-dollar basis. ESSMOs need not be structured on this "full value payment" model, as can be seen by considering examples such as assessment for purposes of property tax payment or general average contribution in admiralty. Linking the valuation to a pair of consequences — for example, the simultaneous issuance of a call and a put — is crucial to eliciting honest valuation statements. But the decision of precisely how to translate a valuation into specific payments must ultimately be based on distributive considerations and on questions about the appropriate social goals, taking into account ex ante incentives. For example, in the property tax assessment context, the goal is merely to spread appropriately the burden of the property tax; hence the valuation generates a percentage tax coupled with the risk of losing one's home in a forced sale. The flamingo tax, in contrast, is Pigouvian in nature and designed to make actors internalize costs imposed on the community. Perverse incentives to produce spillovers would result if one could raise the "buy back" price above one's actual cash contributions. These circumstances argue for full payment at the stated valuation, coupled with the risk of a buyout at that price.
ment of a removal fee). This mechanism addresses the problem of changing community impacts or preferences over time — the rights can simply be bought back at some later date by refunding the fees. Moreover, the “set your own fee” feature helps to protect those with particularly high valuations from being subjected to inefficient transfers. It enables the community to immediately see where flamingo reductions can be made most cheaply.

Thus far, I have been referring to “the community” as if it were a composite person with well-defined preferences. This is clearly not the case. Consider a backyard flamingo display that is very obnoxious to the five neighbors whose backyards border that of the flamingo displayer. This display is inoffensive to everyone else in the neighborhood; it cannot be seen from the street or from anyone else’s property. On a majority-rule vote, the people bothered by the flamingo will lose out to people who would prefer to keep the flamingo fees rather than exercise the option. How can the preferences of individuals be translated into decisions about things like flamingo recalls?

One alternative would be to bypass voting mechanisms altogether and simply allow any community member to contribute private funds to a “flamingo buyback,” based on the strength of her preferences; when the buyback fund reached the option amount, the original call option held by the flamingo displayer would be recalled. However, there is the possibility that spite might generate perverse results under this regime. I have been assuming in this discussion that the flamingo fees would be paid into a centralized fund that would inure to the general benefit of the community. Attempts to allocate the fees to specific neighbors based on the amount of damage that a particular display caused each of them would open up new valuation problems and could lead to strategic interactions among neighbors. But the practice of paying fees into a central coffer while leaving the harmed individuals responsible for funding buybacks leaves open some avenues for the exercise of spite.

Specially harmed neighbors are made worse off by a display that they must pay to stop. So long as the buyback money only serves to refund amounts that the flamingo displayer previously chose to pay in taxes, it does not create any perverse incentives for a purely self-interested homeowner to gratuitously engage in flamingo display. However, it would offer a diabolical opportunity to the homeowner who wished to raise costs for his neighbor by effectively forcing him to fund a buyback. Even though the displayer would be no better off than at the outset (he would only get his fees refunded), he would hold the power to make his neighbor worse off. Conversely, a spiteful individual who is not bothered at all by a neighbor’s flamingo display could threaten to fund a buyback in order to bluff the neighbor into paying a higher flamingo fee. Once again, this effect would probably not be produced by self-interest. Because flamingo fees go into the
community’s central coffer, the neighbor does not benefit (much) when
the flamingo displayer pays a higher fee. But the neighbor might
relish the opportunity to inflict costs on her neighbor.

Although it would be foolhardy to underestimate the role of spite,
this problem does not seem insurmountable. For one thing, the
“spited” party in each situation can call the bluff of the other party.
The gratuitous flamingo displayer could simply be ignored, for exam-
ple. If he does not actually value display more than the display fees he
is paying, the financial burden should eventually prompt him to desist.
Likewise, the flamingo displayer who is bullied by a neighbor’s buy-
back threats might call the neighbor’s bluff by refusing to pay higher
fees.

Another design issue raised by this example is the question of what
should happen once flamingo buyback occurs. Should it be “final,” so
that the individual can never again display a flamingo? Should the re-
called entitlement be protected (in the hands of the community) with a
property rule? Should the community’s entitlement “run with the
land” so that nobody on that site can display a flamingo ever again
without gaining clearance from every neighbor? Making the buyback
this permanent seems unnecessary and potentially inefficient. Adding
features like a waiting period or a hefty “reissue” fee, however, would
deter people from lightly forfeiting and re-obtaining display permits.
Certainly, any amounts expended in the buyback effort would have to
be surrendered in a lump sum, along with the tax for the new year.

The customized callable call raises additional issues. We might
worry about the complexity of this device and question whether the
efficiency gains it produces are really worth the trouble. In addition,
some community impacts are less amenable to this mechanism than is
a decision to place a plastic flamingo in the yard. Sometimes the prob-
lem relates to the difficulty of reversing an impact. Structures and cer-
tain sorts of pollution cannot readily be “undone,” for example. In
other cases, it is technologically possible but socially costly to reverse
an impact. Consider, for example, applying this customized callable
call to petkeeping. The prospect that one’s right to keep a dog could
be “called” raises very troubling issues, especially in a society already
characterized by high levels of pet abandonment. There are ways to
address these concerns through additional fine-tuning (for example,
safe harbor periods during which an exercised option would not be
callable), but again, this fine-tuning comes at the cost of increased
complexity.

She would be entitled to a per-household share of the fees collected, in the form of lowered
homeowners’ association assessments or better common facilities. But in a community of any sig-
nificant size, the additional fees paid by a single homeowner are unlikely to generate much per-
sonal benefit.
At bottom, this section presents a call for greater attention to the potential for relieving intra-neighborhood spillovers through innovation in entitlement design. Experimentation with different entitlement forms in private neighborhoods has lagged far behind the proliferation of this ownership form, and the theoretical problems private neighborhoods present have been given much less attention than similarly structured problems in other settings. Yet there is perhaps no setting in which experimentation with entitlement forms is more feasible and appropriate. Through mechanisms like the one described here, we might use entitlement structuring to assist in controlling community spillovers, rather than relying strictly on community homogeneity to solve commons (and anticommons) problems. If we think that homogeneity has costs of its own, such as the “re-sorting” and associated instability that may be required to maintain it, a search for substitutes is in order.

3. Strategic Behavior and Fairness. — With a sketch of the neighborhood ESSMO in mind, we can consider in a concrete manner two broader concerns that have been lurking in the background, both of which have implications for ESSMOs of all sorts. The first is the degree to which an ESSMO like the customized callable call represents a “strategy proof” or incentive-compatible way to elicit true valuations. The second is how well such mechanisms deal with issues of distributive justice or fairness. Because these two concerns overlap significantly, I will take them up together.

As noted above, the flamingo displayer’s valuation choice in the context of the customized callable call is constrained by two conflicting design features. First, because her payment into the community’s tax system is linked to her valuation, she has an incentive to make her valuation as low as possible. Second, because her neighbors’ recall rights are based on her valuation, she will want to set the valuation high enough to keep them from recalling the entitlement too easily. But these conflicting incentives will not necessarily induce the displayer to disclose her actual valuation. Instead, she may attempt a strategic understatement.

If a homeowner actually has to pay her full valuation to display yard art, she enjoys no surplus. Therefore, she will prefer to offer a valuation that is lower than her actual valuation, but still high enough to stave off retakings. One strategy might be to look around at the valuations of other similarly situated pieces of lawn art, and value hers just a bit higher so that the others will be better targets for reacquisition. This is a risky strategy insofar as the lawn art is nonfungible, and it will always be at least somewhat nonfungible spatially. Alternatively, she might try to predict the reservation prices of the community and its members, and attempt to price her entitlement just a touch higher than that. Once again, heterogeneity in membership and the ability of a variety of different actors to recall the entitlement place
some limits on these strategies, although the robustness of those constraints will depend on the circumstances. The extent to which a strategy of undervaluation will be employed also depends, in part, on other design features such as the time period for which one's valuation is binding, and the protocols and timing features for regaining lost entitlements.

It is worth pinpointing precisely why we should worry about strategic understatements. Here it becomes crucial to distinguish between efficiency considerations and distributive effects. From an efficiency perspective, there are two concerns: 1) that people will misgauge how low they can get away with pricing their entitlements and will end up losing them to those who actually value the entitlements less; and 2) that they will waste time and effort trying to game the system. Recall that from an efficiency perspective, our goal is to facilitate transfers that "should" occur — those to higher-valuing users — while filtering out transfers that "should not" occur — those to lower-valuing users. If a party strategically states a low valuation to avoid paying premiums that correspond to her true valuation, she could lose her entitlement to another party whose valuation is lower than the strategic party's true valuation. This is an inefficient result. Because all of the costs of the inefficiency fall on the undervaluing party, however, a strategizer has a strong incentive to obtain reasonably good information or to protect her interests with a reasonably accurate valuation, whichever is cheaper for her.

Strategic understatements also have distributive implications. If the homeowner must pay a fee that reflects her full valuation of the flamingo display entitlement, then she reaps no surplus; the community instead enjoys the difference between the displayer's valuation and the community's costs. If the community finds that its own valuation of the entitlement exceeds that of the displayer's honest valuation and decides to exercise its call option, then it is able to again reap the full surplus generated by the ensuing transfer. Because the displayer must be paid only what the entitlement is worth to her, the community enjoys any difference between that amount and its own valuation. This feature is not unique to the ESSMO, but instead characterizes all

\[246\] The risk of undercompensated transfers is, of course, even greater with ordinary liability rules.

\[247\] This latter category of inefficiency would include the costs associated with reacquiring an entitlement, where this is permitted, as well as the costs of trying to guess the reservation prices of other parties. Strategic costs are already present in stronger form in ordinary property rule settings.

\[248\] This is analogous to providing one's true reservation price in the Priceline example given earlier. See supra p. 1427.
liability rules. This may seem fair or unfair as a distributive matter, depending on one's views about preexisting rights in the entitlement.

The division of surplus can also have ex ante incentive effects. For example, allowing someone engaging in activities with negative externalities to reap a surplus when another party effectively pays them to stop raises the perverse incentive concerns noted earlier. A final set of concerns involves disparities in liquidity and wealth, which may create distortions if parties are differentially capable of backing up their subjective valuations with required payments. These concerns implicate a larger critique of using willingness to pay as a measure of subjective valuation. As this problem is not uniquely raised by the ESSMO entitlement form, I will only flag it here.

As the various formulations presented in section I.B.3 suggest, and as the potential for complex combinations of options further attests, there is some room to pursue varying social goals and distributive objectives by deciding who begins with the entitlement, who must make various valuation statements, and who must pay whom based on those statements. However, making stated valuations the operative transfer price will assign the lion's share of surplus to one party or the other if the valuations are honest. This distributive arrangement presents pressures in the direction of strategic statements, notwithstanding the dual constraints placed on valuations by the ESSMO's design. The party making a valuation statement will try to wrest a bit of surplus

249 See Polinsky, supra note 23, at 234 (explaining that “all of the ‘gains from trade’ from moving from the entitlement point to the efficient outcome are obtained by the party subject to the liability rule”); see also Mahoney, supra note 56, at 141 (observing that awarding a buyer monetary expectation damages for a contract breach “permits Seller to appropriate the entire gain from termination”). Property rules, in contrast, allow the surplus to be divided between the parties in any manner. Polinsky, supra note 23, at 235; see also Mahoney, supra note 56, at 141 (noting that the award of specific performance in contract allows a variety of outcomes representing different divisions of surplus). Of course, property rules can also generate strategic behavior that dissipates surplus or keeps the surplus-producing bargain from being completed at all. See, e.g., Polinsky, supra note 23, at 238.

250 These views are likely to be highly context dependent and may be open to debate depending on one's particular theory of property ownership. For example, we could imagine applying a version of option making to intellectual property that would require patent holders to set a fee for the use of their patented inputs, and that would require them to back up the level at which that fee had been set by paying a linked tax to a central agency. Whether this seems like a good idea will depend not only on predictions about its impact on ex ante decisions but also on one's normative views about the appropriate degree of ownership that people should have in patents.

251 See Bebchuk, supra note 8, at 604 (explaining that “a given rule's effects on the ex post division of the total pie have an important effect on the overall ex ante efficiency of the rule”).

252 See supra notes 191–194 and accompanying text.


254 See supra note 112 (distinguishing the BDM method). I thank Warren Schwartz for this point.
from the deal, at the risk of losing out in the event she guesses wrong and someone calls her bluff. If she is successful in her strategizing, the only impact will be on the division of surplus between the parties.\textsuperscript{255} If she is unsuccessful, she will bear the loss associated with an inefficient transfer.

In evaluating the performance of ESSMOs on the criteria of efficiency and fairness, it is crucial to keep in mind that we are comparing this entitlement form with other entitlement forms that have well-known imperfections. The potential for strategic action does create some risk of inefficiency, and it also impedes our capacity to orchestrate perfectly the distributive consequences of ESSMOs. However, these problems are not unique to this entitlement form. Property rules feature a much higher-octane set of strategic risks, and the costs of impasse or strategizing fall not just on the strategic party, but on both parties. The ESSMO effectively replaces an open-ended Chicken game with a set of iterated moves that sidestep mutual bluffing behaviors and leave all of the risk associated with strategy on the strategist. Liability rules featuring exercise prices set by a third party also present the same risk of undercompensatory transfers that is introduced in ESSMOs by strategic behavior, but they do so in a way that is much less normatively palatable. A party holding an ESSMO will not lose an entitlement against her will at a price set by the government; rather, she will lose it only by her own invitation in the form of the option she writes for the other party.

\section*{III. OTHER APPLICATIONS}

While control of neighborhood aesthetics provides a particularly appealing setting for experimenting with customized callable calls, there are many other possible applications of this idea. In this last Part, I consider a few of these applications to illustrate the potential of this approach and to suggest some likely avenues for further research. Section III.A looks at the potential applicability of option making to other kinds of land use control and environmental decisions. Section III.B considers how both individuals and institutions might be able to achieve gains by creating options for future "selves."

\textbf{A. Options for the Environment}

The extended example in Part II suggested ways in which the use of option making could address the problem of spillovers. In this section, I suggest two ways in which this basic insight could be applied to larger questions of environmental control and conservation. Section

\textsuperscript{255} If the strategizing itself consumes resources, however, the surplus will be diminished.
III.A.1 discusses the alternatives that the option template presents for controlling pollution. Section III.A.2 examines the possibilities that options offer for interjecting structured flexibility into an increasingly popular method of "perpetual" land use control — conservation easements. 256

1. Option Making for Polluters. — Law and economics scholars have wrestled for decades with the problem of how best to control harmful externalities from valuable activities. Two alternatives to command and control — tradable allowances and pollution fees — have received special attention in the law and economics literature. 257

Both mechanisms suffer from a common shortcoming: it is hard to predict or control how either device, as employed over time and across space under dynamic conditions, will impact the environmental factors of concern. 258

The problems of environments and ecosystems are complex and interconnected; midcourse adjustments are necessary as conditions evolve. Environmental policy must be capable of adapting to changed circumstances and new information. 259

Effluent fees attempt to reprice polluting activities in a way that forces polluters to internalize the costs of their pollution. 260 But fixing the right tax level is difficult, especially if nonlinearities and nonfungibilities make this unit of pollution different from that unit of pollution. 261

Another concern has to do with predicting the elasticity of

256 These easements are billed as being perpetual, but may end up yielding to the evolving needs of future generations. See infra section III.A.2.


258 See, e.g., Robert W. Hahn & Roger G. Noll, Environmental Markets in the Year 2000, 3 J. RISK & UNCERTAINTY 351, 359 (1999) ("Virtually all policy instruments suffer from the problem that any given measure may quickly prove to be obsolete."); Carol M. Rose, Expanding the Choices for the Global Commons: Comparing Newfangled Tradable Allowance Schemes to Old-Fashioned Common Property Regimes, 10 DUKE ENVTL. L. & POL'Y F. 45, 53–55 (1999) (discussing the problem of environmental fluctuation as it relates to the design of tradable allowances).

259 See Rose, supra note 258, at 53–54 (noting the need for "adaptive management" to address fluctuation in environmental conditions).

260 See, e.g., Krier, supra note 257, at 453 (observing that "[w]ith emission fees, the government sets the price, and the market sets the quantity"). Internalization could also be accomplished in principle by subsidizing actors for engaging in pollution-reduction efforts, although this approach has drawbacks in practice. See, e.g., BAUMOL & OATES, supra note 257, at 211–34 (comparing taxes and subsidies and noting some of the difficulties associated with the latter approach); Epstein, supra note 16, at 844–45 (discussing the potential for perverse incentives if a polluter can collect a payment for not polluting); see also Barton H. Thompson, Jr., People or Prairie Chickens: The Uncertain Search for Optimal Biodiversity, 51 STAN. L. REV. 1127, 1179–83 (1999) (comparing the effectiveness of taxes and subsidies in achieving environmental objectives).

261 See, e.g., BAUMOL & OATES, supra note 257, at 179–80 (noting this problem, as well as legal and political difficulties in differentiating effluent fees depending on spatial considerations); WILLIAM F. BAXTER, PEOPLE OR PENGUINS: THE CASE FOR OPTIMAL POLLUTION 88–89
demand for pollution — how much pollution reduction will a given fee produce? What if more companies choose to "pollute and pay" than was originally anticipated? Moreover, as events unfold, even a fee system that was initially calibrated correctly may turn out to tax too heavily or not heavily enough in some instances. It is always possible to increase a tax in theory, but in practice doing so may prove cumbersome.

With tradable permits, the total amount of pollution is capped at some figure that strikes policymakers as correct at a particular time \( T_f \). Thus, policymakers manipulate quantity rather than price; price is left to the market. Setting quantity involves lower informational burdens than setting price. However, new scientific data may change prevailing views about the appropriate capped amount, the severity of damage, or the rate of destruction. As the effluent or species in question interacts with other environmental features and with unpredictable events like weather fluctuations, observed impacts may diverge dramatically from initial predictions. Increasingly sophisticated modeling software may help to increase accuracy, but the results will still be imperfect and in need of midcourse corrections.

Relatedly, tradable allowance markets inevitably lump together things that are not truly fungible in terms of their environmental im-

(1974) (discussing and depicting the disconnect that can exist between the marginal and average rates of harm per unit of pollution); Krier, supra note 257, at 453 (discussing the difficulty in determining "what the right fee is"); Carol M. Rose, Common Property, Regulatory Property, and Environmental Protection: Comparing Community-Based Management to Tradable Environmental Allowances, in THE DRAMA OF THE COMMONS 233, 241 (Elinor Ostrom et al. eds., 2002) (explaining how factors such as "weather patterns, shifts in water temperature and currents, [and] alterations in food sources and predators" make less plausible "the idea of a smoothly curved relationship between human activity (e.g., fishing or pollution) and resource stock levels (e.g., bountiful fish or clean air)").

See BAEUMOL & OATES, supra note 257, at 178 ("The environmental authority cannot be completely sure of the response of polluters to a particular magnitude of an effluent charge; in particular, if the authority inadvertently sets the fee too low, environmental standards will not be met.").

See id. (noting that changes in pollution fees raise costs for polluters as they struggle to adjust, and observing that "[t]he need for repeated changes in the fee is also an unattractive prospect for administrators of the program").

See, e.g., James Salzman & J.B. Ruhl, Currencies and the Commodification of Environmental Law, 53 STAN. L. REV. 607, 617 (2000) (describing a typical “cap and trade” program). As implemented, such programs seem to rely on a “rollback” strategy that aims for reductions below present levels. See Rose, supra note 258, at 54–55.

See Krier, supra note 257, at 453.

Id.

See, e.g., Hahn & Noll, supra note 258, at 359-60 (discussing the need for pollution controls that are capable of responding to changing circumstances and new scientific knowledge); James Wilson, Scientific Uncertainty, Complex Systems, and the Design of Common-Pool Institutions, in THE DRAMA OF THE COMMONS, supra note 261, at 327, 332–35 (discussing the types of uncertainty in natural systems and explaining how nonlinear causal relationships can thwart efforts to extrapolate from past experience).
pact.268 Five acres of wetlands here may not be the same as five acres of wetlands there.269 Likewise, a unit of pollution often has a variable impact depending on when and where it is discharged.270 Thus, in a tradable emissions scheme that allows open-ended trading, environmentally damaging “hot spots” can develop.271 Scholars have developed a variety of interesting proposals to deal with such issues.272 Yet a fundamental tension persists between making trading systems workable (both in terms of administrative costs and in terms of creating “thick-enough” markets) and making them precise in generating the desired set of environmental results.273

Thus, for a variety of reasons, policymakers who set prices or maximum quantities at time $T_1$ will often be in the position, at $T_2$, of needing to modify the entitlements to pollute that have thereby been created.274 Neither fees nor allowances can provide reliable information about whether the value a particular polluter places on the ability to pollute exceeds the pollution’s actual social cost, as it evolves pursuant to spatial and temporal developments. In typical “bigger-than-a-

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268 See, e.g., Salzman & Ruhl, supra note 264, at 625–30 (discussing nonfungibilities of space, time, and type); id. at 612–13 (observing that instead of simply trading “apples for apples,” parties participating in tradable allowance schemes may end up “trading Macintoshes for Granny Smiths, apples for oranges, and, in some cases, apples for Buicks”).

269 See, e.g., id. at 626–27 chart 1 (showing nonfungibilities of space, type, and time in wetlands management and other environmental trading markets).

270 See, e.g., Jonathan Remy Nash & Richard L. Revesz, Markets and Geography: Designing Marketable Permit Schemes To Control Local and Regional Pollutants, 28 ECOLOGY L.Q. 569, 576–79 & graphs 1 & 2 (2001) (discussing and depicting possible relationships between pollutant concentrations and harm to social welfare); Rose, supra note 258, at 61 (“Because of wind and weather conditions, emissions [of sulfur dioxide] in some places cause more damage to forests and lakes than do emissions in other places.”).

271 See, e.g., Nash & Revesz, supra note 270, at 580–82; Salzman & Ruhl, supra note 264, at 613 & n.10.

272 See, e.g., BAUMOL & OATES, supra note 257, at 182–88 (discussing various approaches to spatial issues in permitting systems, including permits allocated on a per-receptor point basis, and pollution offset systems that would restrict transfers to those that do not violate environmental quality standards at any receptor point); Nash & Revesz, supra note 270 (describing previous approaches to the problem before presenting their own solution, which would use a website interface and simulation software to receive, review, and approve or disapprove proposed trades).

273 James Salzman and J.B. Ruhl discuss this tension at some length, presenting a contrast between “fat and sloppy” trading situations that allow quite nonfungible environmental allowances to be traded as if they were equivalent but provide thick, workable markets, and “thin and bland” trading situations that more carefully tailor tradable allowances along environmentally relevant dimensions but end up thinning the market to the point of uselessness. See Salzman & Ruhl, supra note 264, at 645–47; see also Rose, supra note 258, at 59–62 (discussing how increasing complexity in order to account for factors like nonfungible pollution would erode the simplicity and transparency that facilitate the definition, trading, and monitoring of entitlements).

274 See Hahn & Noll, supra note 258, at 360 (emphasizing that the pollution problem is dynamic and that “[c]ircumstances may change so that the most efficient number and allocation of permits will be different”).
breadbox" fashion, we know only whether a party's true valuation is higher or lower than the exercise price set by the government or the going price set by the market. Option making offers a more flexible way of addressing the problem of unfolding knowledge in a dynamic environment marked by temporal and spatial nonfungibilities.

The approach I have in mind follows on suggestions in the literature to consider new ways to combine instruments for controlling environmental harms. To begin, consider the entitlement regime created by tradable allowances. These instruments offer "property-like" entitlements to engage in given levels of pollution, which must be purchased at the then-market price. However, they are created by the government against a backdrop of governmental regulation and held subject to future governmental action. For example, the statute creating tradable allowances in sulfur dioxide explicitly states that no property right has been thereby created, that an allowance merely constitutes "a limited authorization to emit sulfur dioxide," and that "[n]othing in this subchapter or in any other provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization." The permit is therefore held subject to some sort of government call option, but the terms of that option are unclear.

The government always has a background ability to acquire property for public use pursuant to the power of eminent domain by paying just compensation — fair market value. But the statutory language suggests that the government has preserved in itself a call option to reclaim or extinguish the permit at an exercise price of zero. This reservation creates a difficulty: tradable allowance markets cannot pro-

275 See supra pp. 1436–37.

276 See, e.g., Rose, supra note 258, at 70–72 (discussing possible ways to mix common property regimes with proprietized solutions such as tradable allowances); Richard B. Stewart, Privprop, Regprop, and Beyond, 13 HARV. J.L. & PUB. POL'Y 91, 93 (1990) (discussing "the possibility of intermediate or hybrid alternatives — the deliberate creation of new systems of property that can overcome common-law failure while avoiding many of the characteristic abuses of centralized command and control regulation").

277 See, e.g., Krier, supra note 257, at 449 (describing marketable allowances in sulfur dioxide as "hybrid property rights"); Stewart, supra note 276, at 93–95 (presenting transferable pollution permits as an example of a hybrid form of property).


279 See, e.g., United States v. Reynolds, 397 U.S. 14, 6 (1970) (observing that "the fair market value of the property at the time of the taking" is the "basic measurement of compensation" under the Takings Clause).

280 See DANIEL H. COLE, POLLUTION AND PROPERTY: COMPARING OWNERSHIP INSTITUTIONS FOR ENVIRONMENTAL PROTECTION 53–54 (2002) (discussing the EPA's rights under the Clean Air Act Amendments "to terminate or limit" allowances without paying compensation (quoting 42 U.S.C. § 7651b(f) (2000))); Krier, supra note 257, at 449 (observing that tradable allowances possess "some essential property-rights characteristics" notwithstanding this legal limitation).
ceed efficiently unless participants believe that the government is unlikely to pull the entitlement without notice or compensation. As a political matter, any efforts to simply extinguish the rights created through the permits will encounter strong resistance from those who have purchased them. At the same time, the government clearly needs the power to adapt to changing circumstances.

Private actors use option contracts to address uncertainty over time. There is no reason why the same template, appropriately modified, could not be applied in the environmental context. For example, we could make the nature of the retained governmental call option explicit, and make the exercise price turn on self-assessed valuations provided by polluters. By doing this, a system would be put into place for adapting to changes in circumstances or new facts about environmental impacts, based on valuations provided by the affected parties. Rather than requiring the government to respond to problems like “hot spots” with a regulatory overlay that erodes some of the benefits of the marketplace, the government could respond selectively to evolving patterns of pollution based on valuation information provided by the polluters themselves.

281 See COLE, supra note 280, at 55 (citing Jeanne M. Dennis, Smoke for Sale: Paradoxes and Problems of the Emissions Trading Program of the Clean Air Act Amendments of 1990, 40 UCLA L. REV. 1101, 1137 (1993)) (observing that the market for sulfur dioxide allowances could be destroyed if the allowances were viewed as highly insecure, and suggesting that the market’s success is in part attributable to the EPA’s expressed intention not to interfere with emissions allowances absent compelling justification); Hahn & Noll, supra note 258, at 353 (“If emission permits are expropriated and/or the rules for exchange are changed frequently, firms will be reluctant to engage in trades that enhance efficiency.”).

282 See, e.g., Hahn & Noll, supra note 258, at 359 (“For marketable permits, in particular, the concern among environmentalists is that once a firm has paid for a permit, it will have strong political and legal arguments to prevent that permit from being taken away should circumstances change.”).

283 See supra pp. 1472–73 (discussing uncertainty and the importance of adaptive management). One possibility is to make permits time-limited. See COLE, supra note 280, at 47–48 (discussing J.H. DALES, POLLUTION, PROPERTY AND PRICES: AN ESSAY IN POLICY-MAKING AND ECONOMICS 95 (1968)). By staggering expiration dates, government could assure itself an ability to remove some percentage of the permits in any given year. Tom Tietenberg, The Tradable Permits Approach to Protecting the Commons: What Have We Learned?, in THE DRAMA OF THE COMMONS, supra note 261, at 197, 206 (describing a staggered “cascade of fixed-term entitlements”). However, this might provide insufficient flexibility to address major changes in environmental factors or scientific knowledge.

284 For example, a system that makes an up-or-down decision about each proposed trade in the temporal sequence in which it is received, see Nash & Revesz, supra note 270, at 633–34, fosters a race to obtain permits in particular areas. Parties with entitlements in highly sought-after areas (into which no new permits are allowed to enter) can demand higher prices for those entitlements, and the accordingly thinner market may lead to a bargaining impasse. It is always possible that permission for a permit will “open up” in a previously over-polluted area as a result of other movement over time, but again, value attaches to timing choices that may not otherwise be efficient.
The mechanics in this context are similar to those in the private neighborhood example. The polluter might be required, at the time she acquires each of the permits and annually thereafter, to state the amount that the permit is worth to her. She would then pay a tax based on that amount. If conditions required the government to later "recall" some of the permits, it would do so by paying the self-assessed valuation to the parties whose permits were recalled, financing those recall payments with valuation taxes. The basic idea is no different than that behind the law of general average contribution.285

To illustrate, suppose a hot spot develops as a result of tradable allowance transactions. Companies A, B, and C all contribute to the hot spot condition: A holds five permits to engage in the pollution in question, and B and C hold three and two permits, respectively. Suppose further that a recall of four permits will eliminate the hot spot and restore the environment to acceptable levels. Where should those reductions come from? As each company acquired each permit, it also provided a valuation amount as follows, upon which each company has been paying periodic taxes.286

<table>
<thead>
<tr>
<th>Company</th>
<th>Permit 1</th>
<th>Permit 2</th>
<th>Permit 3</th>
<th>Permit 4</th>
<th>Permit 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>$500</td>
<td>$500</td>
<td>$400</td>
<td>$300</td>
<td>$200</td>
</tr>
<tr>
<td>Company B</td>
<td>$500</td>
<td>$250</td>
<td>$220</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Company C</td>
<td>$700</td>
<td>$230</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

The efficient move will be for the government to acquire the four "cheapest" entitlements — Permit 5 from Company A ($200), Permits 2 and 3 from Company B ($250 and $220, respectively), and Permit 2 from Company C ($230). It will pay off these companies at their stated valuations, for a total of $900.

The advantage of this approach is that it leverages private information about valuation and allows finer-grained responses to changes over time. But there are shortcomings. One difficulty has to do with problems of irreversibility. After a problem develops, it may be diffi-

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285 See *supra* pp. 1440-42 (discussing this admiralty rule, which relies on self-assessed valuation). The analogy may be imperfect, to the extent that the government responds differently than would a private party to the incentive structure produced by heterogeneity in the valuation of permits. See *infra* note 302.

286 These valuations will be subject to the kinds of strategizing (and the constraints on strategizing) discussed in section II.D.3. The possibility of collusion and "price fixing" among companies exists in this context as well, but can presumably be controlled through ordinary enforcement channels.
cult to "call back" the harm. It is one thing to ameliorate plastic flamingo "hot spots," and quite another to attempt to overcome serious, lasting damage to the environment that has resulted from an overconcentration of pollutants. Yet perhaps the intuitive force of the customized callable call can spark ideas for fine-tuning some of the other suggestions already on the table. For example, perhaps the web-based system that Jonathan Nash and Richard Revesz recommend for controlling spatial pollution impacts could be modified in ways that would be sensitive not only to who arrived first, but also to who stated a higher valuation for the entitlement.

Ideas like these merely represent illustrative starting points for discussion. The questions presented by environmental control design are difficult ones to which tremendous scholarly attention has been devoted. Yet the notion of harnessing private information through option making is one whose potential has not yet been fully explored in this context.

2. **Conserving Options.** — Option making might also more flexibly serve the goals that are currently being pursued through conservation easements. These land use devices, which have rapidly proliferated in the last quarter century, are designed to preserve in perpetuity a particular pattern of land use (or nonuse). Like the covenants considered earlier, these easements represent private decisions to bind both present and future actors' choices about land use; however, they are publicly subsidized through favorable tax treatment. Although these easements are customizable in many ways, they always seem to contemplate property rule protection that would ban using land in unauthorized ways. Of course, future legislatures and courts can

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287 See, e.g., Ayres & Balkin, supra note 24, at 708 (discussing this point, previously raised in Kaplow & Shavell, supra note 8, at 767–68, and offering some partial answers).

288 See Nash & Revesz, supra note 270, at 624–61.

289 For example, the website might be set up to enable a proposed sale to go through if the stated valuation of the newcomer is higher than the exercise price of an existing permit in the vicinity that feasibly can be recalled. The newcomer would have to pay tax on that valuation amount, of course, but would not have to negotiate for purchase in a thin market that may generate a bargaining impasse.


292 See, e.g., Mahoney, supra note 290, at 752–53 (noting the flexibility available to the contracting parties in creating the easement); Jeffrey M. Tapick, Note, Threats to the Continued Existence of Conservation Easements, 27 COLUM. J. ENVTL. L. 257, 261–62 (2002) (noting the ability of parties to tailor conservation easements to fit their needs).

293 Injunctive relief is typically available for violation of a conservation easement. See RESTATEMENT (THIRD) OF PROP: SERVITURES § 8.5 (2000) ("A conservation servitude held by a governmental body or a conservation organization is enforceable by coercive remedies and
always find ways to overcome the resulting rigidity of these land use restrictions. Yet the possibility of post hoc changes in the operating rules diminishes the value of setting up conservation easements now and adds uncertainty for the parties creating — and subsidizing — these interests.

Mandatory option making interjects flexibility at the outset; future generations need not rely on political processes or jurisprudence to correct an excessive rigidity built into the original design. Despite the commonplace assertion that we must leave future generations “options,” the idea does not seem to have been seriously considered in its literal, formal sense. This is a significant omission, given the capacity of options to expand the range of policy choices through entitlement design. It would be entirely possible to require current generations to offer call options to future generations. This approach would facilitate efficient future transfers by providing a way of testing the relative valuations that each group places on a particular use of the entitlement.

It is not difficult to imagine how such a mechanism would work in this context. The purchaser of the conservation easement (a governmental entity or qualifying nonprofit) would be required, at the time of purchase, to set up a “running call option” through which the landowner in possession could “reclaim” and thereby extinguish the easement. The minimum exercise price that the landowner would have to pay to reclaim the easement would be the aggregate tax benefits or other payments that the landowner received for granting the easement, plus a market rate of interest. Requiring a repayment of tax benefits as a first step to reclaiming the easement would eliminate some of the concerns that have led to restrictions on the alienability of these easements.

other relief designed to give full effect to the purpose of the servitude.

294 See, e.g., Mahoney, supra note 290, at 770–79 (discussing potential avenues for modifying, terminating, or extinguishing conservation easements); Tapick, supra note 292, at 276–86 (discussing various ways in which conservation easements might be challenged or terminated).

295 See Mahoney, supra note 290, at 779 (noting that the tax benefits associated with conservation easements would amount to a “government giveaway” rather than a purchase to the extent that the interest conveyed does not prove to be durable).

296 See, e.g., id. at 741 (noting “widespread support” for considering the long-term effects of current actions so that “future generations are not deprived of a full range of options”).

297 The landowner in this case holds the possessory estate (the fee interest), and another entity holds a nonpossessory interest in that land (the easement). The “reclaim” procedure discussed here would reunite the full interest in the land in the hands of the landowner. This reclamation extinguishes the easement as a separate interest, since a landowner cannot hold an easement in her own land. See, e.g., Van Sandt v. Royster, 83 P.2d 698, 700 (Kan. 1938).

298 See Mahoney, supra note 290, at 774, 779.
The entity acquiring the easement could also, at the time of purchase or at any time thereafter, provide additional payments to the holder of the fee interest or set up streams of payments that would continue over time. These amounts would also have to be repaid if the landowner wished to reclaim the easement. The easement holder, then, would hold an ESSMO. The entity not only decides how much to pay for the easement initially (hence setting a lower bound on the landowner’s call option), but can also raise the exercise price for the landowner’s option over time in accordance with its shifting valuation of the easement. The landowner’s option would be a “running” call option in two senses. First, the call option would run with the land, just as the easement itself does. This would give later owners of the possessory estate the same opportunity to reclaim the easement that their predecessors enjoyed. Second, the option’s exercise price would be made up of a running total of the payments, with interest, paid to the landowner and her predecessors.

This system might initially seem underprotective of conservation interests. But recall that the government always holds a trumping call that could be exercised in these circumstances—the ability to acquire the entire estate through eminent domain in order to preserve it for public use. To strengthen the protection afforded by eminent domain, we might specify the following method of arriving at just compensation: the value of a property that has undergone conservation easement reclamation within the past thirty days shall equal the market value of the property as burdened by the easement, plus the amount that the landowner paid to have the easement lifted. Thus, the original call that the landowner can exercise to reclaim the easement would itself be “callable” in accordance with a defined valuation methodology.

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299 Nonprofit groups or interested citizens could also be permitted to contribute to the “easement reclaim” price applicable to the landowner.

300 This period could obviously be shorter or longer. The idea would be to balance the government’s interest in exercising eminent domain at a fair price with the landowner’s interest in proceeding with her plans for the land, unburdened by the easement.

301 One question is whether this approach would avoid “just compensation” concerns under the Takings Clause. Cf. Levmore, supra note 25, at 778 n.25 (noting that the just compensation requirement could present a hurdle if self-assessed valuation mechanisms produced compensation far below the market value). Assuming the government could forbid reclamation of easements altogether, presumably it could also set reasonable, proportionate conditions on that reclamation that are designed to further the original conservation purposes of the easement. Cf. Dolan v. City of Tigard, 512 U.S. 374, 391 (1994) (establishing a “rough proportionality” requirement for land use exactions); Nollan v. Cal. Coastal Comm’n, 483 U.S. 825, 837 (1987) (setting out a nexus requirement for land use exactions). To the extent a landowner’s reclamation of an easement triggers an exercise of eminent domain and the payment of compensation below the then-market price for an unburdened parcel, that reduction in compensation would merely represent the difference between what the landowner paid to reclaim the easement and the amount that the reclamation of the easement increased the land’s value.
This elaboration opens up the possibility of allowing the landowner to further customize this callable feature. As discussed above, the landowner would face a minimum easement reclaim price of the running balance, plus interest, of payments (including tax benefits) already received in exchange for the easement. She could, however, be allowed to pay a larger amount for easement reclaim, at her option. The impetus for doing so would be to increase the exercise price of the call option that reclamation of a conservation easement gives the government, which would make her land a less likely target for eminent domain.

For example, suppose landowner L has a burdened parcel of land and would like to get the easement lifted. The land is worth $500,000 as burdened, but would be worth $2 million if unburdened. Tracing back through land records, she sees that the payments credited to her predecessors for the easement, with interest, total $100,000. Under the “running call option” mechanism, she could reclaim the easement and release the land from its burden by paying a minimum of $100,000 to the easement holder. The moment she reclaims the easement at a price of $100,000, however, she creates in the government a call option with an exercise price of $600,000 (the market price of the land as burdened, $500,000, plus the easement reclamation price of $100,000). She might therefore choose to pay somewhat more — perhaps $250,000 — to lift the easement. Doing so would raise the price of the government’s call option to $750,000, making it less likely that the government would choose to exercise eminent domain over the landowner’s property.\footnote{The government’s price sensitivity depends on the relationship between monetary costs and political costs. See Daryl J. Levinson, Making Government Pay: Markets, Politics, and the Allocation of Constitutional Costs, 67 U. CHI. L. REV. 345, 348 (2000) ("Because government actors respond to political, not market, incentives, we should not assume that government will internalize social costs just because it is forced to make a budgetary outlay."); see also Daryl J. Levinson, Empire-Building Government in Constitutional Law, 118 HARV. L. REV. 915, 968–71 (2005) (discussing this point in the eminent domain context).}

This example shows just one possible way in which options, with their capacity to reveal relative valuations, could manage conservation over time. I have offered only a brief sketch that is short on details; it is meant merely to suggest the potential for options as a flexibility device in this context. But it is well worth considering whether the best way to conserve options for future generations might be, quite literally, to require the present generation to engage in option making.

B. Options for Self-Management

The notion of option making can also transform policies for dealing with intertemporal conflicts faced by different versions of the same
person or institution. Decisions made by one of these temporal "selves" have spillover effects on other temporal selves that may not be fully internalized by the choosing self. Allowing one temporal self to offer options to later selves provides a powerful and flexible way of accommodating the interests of these different selves. Just as inter-party option making allows an entitlement to move to a party who values it more, so too can intrapersonal or intra-institutional option making allow a particular entitlement to be controlled by the higher-valuing self. Section III.B.1 examines the potential of option making for controlling time-inconsistent behavior, such as an unwanted cigarette habit. Section III.B.2 considers how option making might enable current institutional entities to signal the strength of their preferences in binding ways to later versions of themselves.

1. Choose-Your-Own Sin Tax. — Consider addiction to cigarettes, a problem that at least arguably confounds ordinary notions of rationality.303 Those advocating policies like cigarette taxes deflect charges of inappropriate paternalism by stressing the potential of such policies to make people's long-run selves better off by their own lights.304 A difficulty with making "sin taxes" mandatory across-the-board, however, is that individuals who are not time inconsistent will suffer reduced welfare as a result. For example, some people like to smoke and do not have (and will never have) any desire to stop smoking. It is also difficult to formulate a "stopping rule" for such "for your own good" taxes. Many people are time inconsistent about unhealthy foods, work effort on onerous projects, and activities like watching television and playing video games. In such cases, however, there is great heterogeneity among the population about whether a given act of consumption is consistent or inconsistent with the individual's long-run interests (as conceived by that individual).305 For example, a policy to help the

303 While Gary Becker and Kevin Murphy have developed a model of "rational addiction," see Gary S. Becker & Kevin M. Murphy, A Theory of Rational Addiction, 96 J. POL. ECON. 675 (1988), other scholars have suggested that time inconsistency explains much smoking behavior, see, e.g., Jonathan Gruber & Botond Kőszegi, Is Addiction "Rational"? Theory and Evidence, 116 Q.J. ECON. 1261 (2001). I thank John LeSueur for discussions on this issue.


305 A robust market for devices designed to reduce the consumption of a particular good provides a strong clue that at least some parties have inconsistent preferences (and know that they do) with regard to that good. See, e.g., T.C. Schelling, Econometrics, or the Art of Self-Management, 68 AM. ECON. REV. PAPERS & PROC. 290, 292–93 (1978) (discussing the willingness of smokers to pay money to stop smoking). However, not all consumers of the good in question avail themselves of such products. This might be because they are naifs who do not recognize their own
time-inconsistent person consume fewer ice cream cones would represent a deadweight loss to the blissfully unrepentant ice cream eater.

Some very interesting recent work has attempted to overcome this problem of heterogeneity by devising voluntary, incentive-compatible arrangements that would enable a time-inconsistent person to effectively bind a later self in a way that would make all selves better off.306 Jay Bhattacharya and Darius Lakdawalla propose “smoking licenses” that a person could choose to purchase when starting to smoke. These licenses would subject the smoker’s later-period self to a compensated cigarette tax; the fee for the smoking license would then be refunded in a later period.307 Because the scheme would be voluntary, it could increase the welfare of time-inconsistent agents without reducing the welfare of time-consistent agents (that is, people who rationally wish to smoke and who never experience regret about it).

Option making offers another way of addressing the policy challenges presented by heterogeneity in time consistency. By changing a few design details, the basic insights behind the Bhattacharya and Lakdawalla proposal could be recast as an option that one temporal self offers another. An individual initially moves from a not-yet-smoking self to a smoking self. Suppose that in some cases the smoking self is made up of time-inconsistent facets — the short-run self and the long-run self.308 The long-run self may constantly concoct plans to stop smoking, but the short-run self can repeatedly thwart those plans by smoking anyway. These two selves can be viewed as temporal neighbors sharing the same “airspace” in much the same way as do physical neighbors.309 The actions of each have spillover effects on the other. Ideally, we would want to find out whether the actions of the

306 See BHATTACHARYA & LAKDAWALLA, supra note 45. Proposals that require time-inconsistent people to self-identify have one drawback — sometimes the time-inconsistent person does not recognize herself as such. See id. at 10; see also Ted O’Donoghue & Matthew Rabin, Doing It Now or Later, 89 AM. ECON. REV. 103, 104 (1999) (distinguishing “sophisticated” from “naive” actors). Bhattacharya and Lakdawalla observe that their proposal would not preclude the possibility of additional (paternalistic) regulation, such as that targeting juveniles on the ground that they are especially likely to be naifs. BHATTACHARYA & LAKDAWALLA, supra note 45, at 28.


308 In contrast, the time-consistent smoker would not splinter into these two personalities (at least with regard to smoking) because her interests would be in alignment at all times.

309 Unlike the Bhattacharya and Lakdawalla model, which posits separate periods in a person’s life cycle each featuring a different self, see BHATTACHARYA & LAKDAWALLA, supra note 45, at 8, my discussion assumes that the long-run self and the short-run self vie for control at all times, with the short-run self sometimes winning out and the long-run self sometimes winning out. This approach resembles the “hot state”/“cool state” dichotomy drawn in some of the literature on time-inconsistent preferences. See, e.g., George Loewenstein, Emotions in Economic Theory and Economic Behavior, 90 AM. ECON. REV. PAPERS & PROC. 426, 428–29 (2000) (discussing and citing literature on the “hot-cold empathy gap”).
short-run self are really worth the costs that they impose on the long-run self. Option making offers a way of testing that question.

Suppose that a policy required smokers to obtain a free smoking license in order to purchase cigarettes, with the following unusual caveat: in obtaining a smoking license, the individual would be required to set a cigarette tax for herself. The tax rate would be expressed as a percentage of the purchase price and could be set at any level, including zero. Once the smoker chose the tax, she would be issued a "smart card" that would have to be scanned at the point of sale whenever the smoker purchases cigarettes. That card would automatically add the selected amount of tax to the purchase. Instead of being remitted to the government, however, the tax proceeds would go directly into a special escrow account established for the individual smoker. The smoker could increase her cigarette tax at any time. Tax reductions would also be possible, but constrained in a way that would put them out of reach of the short-run self acting unilaterally.

Ordinarily, the money in the smoker's escrow account could be accessed only to cover medical expenses that the individual might incur from smoking-related illnesses. At any time, however, the smoker could turn in the smoking license to the state and receive the accumulated lump sum in cash. The long-run self might effectively offer the short-run self a deal: "I'll give you this cash, which you can then blow on your myopic short-run desires, but in exchange you have to give up smoking." If the short-run self later regretted this deal and desired a second license, obtaining one would require repayment of the lump sum payout, as well as any additional amount specified by the long-run self at the time of the smoking license turn-in. License reissue

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310 Bhattacharya and Lakdawalla would make smoking licenses optional and (in the short run) costly, BHATTACHARYA & LAKDAWALLA, supra note 45, at 3-4; my proposal makes them mandatory but free of charge. Given the power of inertia, making the license mandatory is likely necessary to get people to focus on the question of future selves at all. Making the license itself free makes the program's intrapersonal financial impacts (which are based on a self-selected tax) entirely optional.

311 This approach would keep inflation or price changes from eroding the tax's impact.

312 Alternatively, the information about the selected tax could be electronically embedded in the smoker's driver's license. See BHATTACHARYA & LAKDAWALLA, supra note 45, at 28 (suggesting such embedding as a possible way of implementing their license plan).

313 One possibility would be to require a person desiring a reduction in her cigarette tax to sign and notarize a document to that effect on two different dates spaced at least one month apart. This would help to insure that any change was a function of deliberations between the long-run self and the short-run self, rather than simply an impulsive unilateral move on the part of the short-run self.

314 Unused portions would revert to the state at the individual's death, to help cover the costs of the program and to cross-subsidize the smoking-related health care costs of other individuals.

315 One concern is that the long-run self would become unduly dictatorial and name an infinitely high second-license price, thereby effectively banning the short-run self from ever being able to indulge her cravings again, no matter how severe they might become. If completely pro-
might also require a specified delay period, such as thirty days.\textsuperscript{316} In addition, any second license would feature a cigarette tax at least as high as the last amount shown on the first license before cash-in.

Effectively, the policy requires the not-yet-smoking self to create a custom call option for the smoking self. If the smoking self turns out to be time inconsistent with regard to her smoking behaviors, she will splinter into a short-run self and a long-run self. The long-run self can later increase the cigarette tax. This increase amounts to an effective repricing of cigarettes designed to take into account their impacts on the long-run self.\textsuperscript{317} As the smoker purchases cigarettes, she is not only exercising a call option but also building up a put option corresponding to the accumulated amount in the escrow account. She can force the collective to buy back her entitlement to smoke in exchange for the accumulated funds in her escrow account.

2. Revealing Options for Institutions. — The preceding section looked at options for individual self-management. Sometimes, however, the “self” in question is an institutional entity that persists, albeit in evolving form, over time. As a final application of option making, I will consider the possibility that present-day entities (whether governmental or private) might offer options to future incarnations of themselves.\textsuperscript{318}

First, consider why entities might wish to offer options to their future selves. Just as individuals can have preferences of different strengths that are difficult to capture in traditional voting arrange-
ments without interpersonal dealmaking across issues (that is, log-
rolling), majorities may have preferences of varying strengths. Sup-
pose the members who presently make up a majority of some deliberative
body have an extremely strong preference for a particular policy
(Policy A). They would like to see Policy A locked into place for as
long as possible, and they worry that Policy A may be overturned later.
This could happen either as a result of membership changes or be-
cause of time-inconsistent preferences that could exist even in an entity
of stable membership.

This situation is analogous to the intrapersonal case, in which an
individual might wish to adopt binding plans now to undertake a sav-
ings program later.\textsuperscript{319} Perhaps she realizes that she will always find it
unpalatable to start saving immediately, but recognizes that it is in her
long-run best interest to save.\textsuperscript{320} Hence, she might precommit now to
save later. It could likewise be the case that any majority would want
Policy A, but majorities who are too close to the implementation of
Policy A will have a momentary temptation to undo the policy. We
can see this by considering a body whose membership does not change
between $T_1$ and $T_2$. At $T_1$, the members vote for Policy A with de-
ferred implementation. At $T_2$, the members myopically vote to undo
it. There is nothing particularly difficult to understand about this pat-
tern if we suppose that Policy A inflicts short-term costs that are
weighted more heavily when they loom directly ahead than when con-
sidered as part of a longer-range plan.\textsuperscript{321}

For example, in a recent working paper, Ariel Porat and Omri Yad-
lin have identified some of the advantages associated with deferred-
implementation mechanisms for achieving redistribution of wealth.\textsuperscript{322}
These advantages turn in part on the "veiling" effect that a temporal
remove provides.\textsuperscript{323} In general, the passage of time introduces uncer-
tainty about whether one will be helped or harmed by a given law; be-
cause of the dynamic nature of identity over time, in a limited sense,
one does not know who one will be in the future.\textsuperscript{324} These advantages

\textsuperscript{319} This is the insight behind the "Save More Tomorrow™" plan proposed by Richard Thaler
Behavioral Economics To Increase Employee Savings,} 112 J. POL. ECON. S164 (2004); \textit{see id. at
S170–86 (presenting positive results from initial trials of the plan, which permits employees to
commit to future retirement savings keyed to pay increases).}

\textsuperscript{320} \textit{See id. at S167–68 (explaining how hyperbolic discounting could lead to preference reversals
about savings).}

\textsuperscript{321} In other words, I am suggesting that the legislature might discount the future hyperbolically.

\textsuperscript{322} Ariel Porat & Omri Yadlin, \textit{Achieving Consensus for Wealth Redistribution Through De-
ferred-Implementation Agreements} (unpublished manuscript, on file with the Harvard Law School

\textsuperscript{323} \textit{See id. at 17–20; see also Vermeule, \textit{supra} note 80, at 408–11.}

\textsuperscript{324} Temporal veiling techniques include making laws prospective, delaying their effective dates,
and making them durable so that they extend far forward in time. \textit{See Vermeule, \textit{supra} note 80,
are, however, unattainable if the legislature retains the freedom to repeal the act as its effective date arrives.

A legislature might, therefore, wish to do something similar to individual precommitment at time $T_1$ to impress upon the later incarnation of itself the importance of Policy $A$. One possibility is that the $T_1$ body could offer an option to the $T_2$ body. The $T_2$ body always has the option of undoing the legislation at the price of getting together the requisite votes. However, there is no conceptual reason why the $T_1$ body should not be able to raise the exercise price of the option that the $T_2$ body will have open to it. The examples we have already run through offer a strong clue to the general approach here. We would want to effectively require the $T_1$ body to express the strength of its preference in a way that would create a sort of bonded "policy lock" on Policy $A$ that could only be undone if the body in power at $T_2$ actually had a stronger preference.

We might imagine a $T_1$ entity creating a "locking fund" into which its current members would appropriate from their budget an amount representing the strength of their aggregate preferences that the policy not later be undone. This fund would immediately become available to the opponents of Policy $A$ to apply to public projects of their choosing or to save for later use. Later, when Policy $A$ undergoes reconsideration, the policy’s opponents would be required not only to win the vote, but also to come up with enough money to repay the "locking fund" amount (which would go to the then-losers on the Policy $A$ vote).

The discussion in this section has been at a fairly high level of abstraction. For the notion of intra-institutional option making to operate in any real-world context, careful attention to a wide array of design considerations would be essential. Nevertheless, I hope that the intuitions driving this discussion suggest some interesting possible directions for innovation in institutional design.

**CONCLUSION**

Private subjective valuations present difficulties for achieving efficiency through law. The two primary ways of structuring entitlements reflect different responses to those difficulties. Property rule protection places a premium on avoiding inefficient transfers by allowing entitlement holders’ valuations to trump those of all others. But, by giving cover to strategic holdouts who misrepresent their valuations, property

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at 408–11, 415–24 (discussing these veiling techniques). Temporal features like these can debias judgments by generating role instability and an associated payoff uncertainty.

325 I will not consider the constitutional implications of what I am proposing. For purposes of discussion, we can assume that the decisionmaking body under consideration is a private entity, such as a club or homeowners’ association.
rules can also block efficient transfers. Liability rules make efficient transfers easier, but at the price of substituting the valuation derived by a third party for that of the entitlement holder — a substitution that opens the door to inefficient transfers.

Options analysis points to a little-recognized middle way — using self-assessed valuations as the basis for unilateral transfers. Using the analytic building blocks found in prior work on entitlements, options, and self-assessed valuation mechanisms, I have suggested the possibility of entitlements subject to self-made options, or ESSMOs. Here, the entitlement holder is given no veto power, but holds instead the bare power of option pricing — a power constrained through mechanism design to avoid gross overstatements or understatements. The options formulated under such a rule are revealing ones that have the potential to transform a variety of legal problems. They are particularly well-suited to applications involving dynamic, multiplayer repeat games, such as those involving commonly owned resources.

In exploring possible ways to structure entitlements, we must always be conscious of the risk that we are “approach[ing] a false optimum by a series of games which are not worth the candles used.”326 The applications sketched in this Article are admittedly not fully formed. They are concept vehicles, created to test reactions, illustrate possibilities, and advance fresh approaches to design. Whether any of the specific examples set out here will repay the candles consumed is an open question. I hope, however, that they have collectively reflected enough light to spark further inquiry into the potential of revealing options for law.

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