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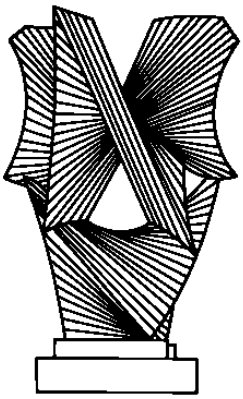

PROPERTY AND PRECAUTION

Lee Anne Fennell

THE LAW SCHOOL
THE UNIVERSITY OF CHICAGO

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PROPERTY AND PRECAUTION

Lee Anne Fennell[*]

Property in land suffers from an unacknowledged precautionary deficit. Ownership is dispensed in standardized blocks of monopoly control that are routinely retained in their entirety until someone raises an issue regarding an actual or potential incompatible land use. This arrangement, which encourages owners to take sustained, unpriced draws against a limited stock of future flexibility, sets the stage for future impasse as inconsistent plans develop. It also makes property an unnecessarily accident-prone institution, given the role that bargaining failure plays in producing costly land use conflicts. Expanding the slate of potential precautions beyond owners' locational and operational choices to include their choices about the strength and content of their own entitlements offers new traction on land use disputes. It also presents interesting institutional and theoretical challenges. In this essay, I propose using a local option exchange to confront owners with the opportunity costs of maintaining veto power over unused, low-valued rights. Enabling owners to relinquish property-rule protection of such rights before conflicts arise could make property more flexible and communicative, and hence reduce the costs of incompatible land uses. This approach requires rethinking the limits of customization in property bundles and the potential for owner participation in entitlement definition.

INTRODUCTION

On a Coasean analysis, land use inefficiencies boil down to breakdowns in bargaining.[1] For decades, the economic analysis of property rights has focused on ways to sidestep these bargaining failures, whether through well-chosen initial entitlement assignments or mandatory liability rules. Yet

[*] Professor of Law, University of Chicago Law School. For very helpful comments and conversations, I am grateful to Omri Ben-Shahar, Mary Anne Case, Eric Claeys, Aziz Huq, Edward Iacobucci, Gregory Keating, Jonathan Masur, Richard McAdams, Jonathan Nash, Eduardo Peñalver, Ariel Porat, Julie Roin, Jennifer Rothman, Theodore Seto, Troy Rule, Warren Schwartz, Christopher Serkin, and participants in the 2011 annual meeting of the American Law and Economics Association, the Property, Tort, and Private Law Theory Conference at the University of Southern California Law School, a University of Toronto Law and Economics Workshop, and faculty workshops at Loyola Law School Los Angeles, UCLA School of Law, and the University of Chicago Law School. I thank John O'Hara and Eric Singer for excellent research assistance, and the Stuart C. and JoAnn Nathan Faculty Fund for financial support.

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

the idea that owners might voluntarily reconfigure their entitlements to reduce the costs of future transactions has received surprisingly little attention. This omission is puzzling, given that property rights typically embed veto powers that can create potent impediments to efficient outcomes.[2] In this essay, I examine the advance concession of property rule protection as a potential precautionary measure capable of reducing the incidence and cost of land use conflicts. This approach follows logically from a view of incompatible land uses (and thwarted land use changes) as slow-motion collisions, given the role that bargaining impasse plays in these crashes. Owners' choices about the strength and shape of their property entitlements, no less than their decisions about where to locate or how to conduct a particular enterprise, influence how inconsistent plans for real property will play out. It follows that these entitlement decisions could represent a locus of precautionary efforts.

Property scholars working in law and economics are no strangers to the use of tort-related principles and frameworks. Foundational work by Ronald Coase and by Guido Calabresi and Douglas Melamed[3] intentionally blurs the line between property and torts.[4] Property theorists have likewise adapted Calabresi's approach to accident costs to their subjects of inquiry.[5] But new insights might be gleaned from explicitly thinking about land use conflicts as a type of low-speed collision in which entitlement structure

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[2] Whether the strategic holdout problems associated with property rule protection should be classed as a subset of transaction costs or treated as a separate set of impediments to bargains is open to question. *See, e.g.*, Lee Anne Fennell, *Common Interest Tragedies*, 98 NW. U. L. REV. 928 n. 92 (2004) (collecting cites); *cf.* HAROLD DEMSETZ, FROM ECONOMIC MAN TO ECONOMIC SYSTEM: ESSAYS ON HUMAN BEHAVIOR AND THE INSTITUTIONS OF CAPITALISM 116-17 (2008) (classifying free-rider problems as "ownership costs" rather than "transaction costs"). In this essay, I will refer to holdout costs as a subset of transaction costs, while emphasizing their unique connection to the institution of property as presently configured.

[3] Coase, *supra* note 1; Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972).

[4] *See, e.g.*, Calabresi & Melamed, *supra* note 3, at 1089 (noting the need for a "unified perspective" on property and torts and offering a framework "integrating the various legal relationships treated by these subjects"); Robert Cooter, *Unity in Tort, Contract, and Property: The Model of Precaution*, 73 CAL. L. REV. 1 (1985) (using precaution as a unifying principle across doctrinal boundaries, building on Coase's work); Thomas W. Merrill & Henry E. Smith, *What Happened to Property in Law and Economics?*, 111 YALE L.J. 357, 378-79 (describing and critiquing the "torts perspective" on property rights found in the work of Coase and Cooter). The influence of Coase and of Calabresi and Melamed on property theory and the analysis of land use conflicts has been well noted. *See, e.g.*, Jeff L. Lewin, *Compensated Injunctions and the Evolution of Nuisance Law*, 71 IOWA L. REV. 775, 785-803 (1986); Merrill & Smith, *supra*, at 366-83.

[5] Calabresi's approach to accident costs calls for minimizing the sum of accident costs, prevention costs, and administrative costs. GUIDO CALABRESI, THE COSTS OF ACCIDENTS 26-31 (1970). This framework has since been applied to land use questions, among other legal contexts. *See, e.g.*, Robert C. Ellickson, *Alternatives to Zoning: Nuisance Rules, and Fines as Land Use Controls*, 40 U. CHI. L. REV. 681, 687-91 (1973); *see also* NICOLE STELLE GARNETT, ORDERING THE CITY: LAND USE, POLICING, AND THE RESTORATION OF URBAN AMERICA 135 (2010) (applying Calabresi's framework to order-maintenance and crime control within cities); RICHARD A. EPSTEIN, SIMPLE RULES FOR A COMPLEX WORLD 32-33 (1995) (suggesting that Calabresi's formulation captures "the social function of law"); Richard A. Posner, *Guido Calabresi's* The Costs of Accidents*: A Reassessment*, 64 MD L. REV. 12, 15 (2005) (describing Calabresi's framework as "simple and useful" if "not entirely satisfactory" and noting its applicability "to a wide variety of law-regulated activities, whether accidents, which were Calabresi's focus, or pollution, land use, contracts, or virtually any other social activity with which the law is concerned").

itself represents a potentially dangerous element.[6] The design of property rights, I suggest, represents an underappreciated margin of adjustment through which we might seek to minimize the costs of land use conflicts and their prevention.[7]

That design choices embed precautions and thereby influence the overall costs of accidents is obvious when we are talking about whether cars should be built like slow-moving tanks[8] or equipped with "spongy bumpers."[9] Yet property scholarship, although steeped in the analysis of entitlements,[10] has done little to examine whether we have designed property rights packages that deliver the right combination of speed, maneuverability, crash-resistance, flexibility, and protection.[11] Reflection on this question reveals that we have, in fact, inherited an institution that is remarkably accident prone—so rigid and brittle, in fact, that new and incompatible uses must be constantly managed through coercive action. Property law delivers highly potent, standardized blocks of monopoly control to landowners by default,[12] but offers no simple way for owners to downgrade their protection selectively and voluntarily in advance of a conflict. When incompatible land use plans arise, coercive governmental action often becomes necessary to override owners' veto power.[13] But

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[6] The accident analogy has been used by a few scholars in land use contexts, although in a narrower manner than I employ it here. *See, e.g.*, Eric Kades, *Avoiding Takings 'Accidents': A Tort Perspective on Takings Law*, 28 U. RICH. L. REV. 1235, 1263 (1994) (analogizing government condemnation to accidents for purposes of exploring the potential for private insurance to substitute for government-provided compensation); Louis Kaplow, *An Economic Analysis of Legal Transitions*, 99 HARV. L. REV. 509, 563 (1986) (distinguishing the accident scenario from that of legal transitions); *see also* Eric Claeys, *Jefferson Meets Coase: Land-Use Torts, Law and Economics, and Natural Property Rights*, 85 NOTRE DAME L. REV. 1379, 1386 (2010) (describing an "accident law and economics" paradigm concerned with efficiency and discussing its applicability to "land-use torts"). Also distinct from my inquiry are analyses of actual accidents (such as chemical leaks or explosions) that occur on land. *See, e.g.*, Gregg P. Macey, *Coasean Blind Spots: Charting the Incomplete Institutionalism*, 98 GEO. L.J. 863 (2010).

[7] Efficiency analysis has often focused on minimizing these two sets of costs. *See* CALABRESI, *supra* note 5, at 26 ("Apart from the requirements of justice, I take it as axiomatic that the principal function of accident law is to reduce the sum of the costs of accidents and the costs of avoiding accidents."); Cooter, *supra* note 4, at 2 (developing a "model of precaution" that examines the interaction between "the direct cost of harm and the cost of precautions against it"); *see also* text accompanying notes 33-34, *supra*.

[8] *See* GUIDO CALABRESI, IDEALS, BELIEFS, ATTITUDES, AND THE LAW: PRIVATE LAW PERSPECTIVES ON A PUBLIC LAW PROBLEM 9 (1985) (using this example to illustrate costs of accident prevention).

[9] CALABRESI, *supra* note 5, at 136-39 (using "spongy bumpers" to illustrate an efficient precaution).

[10] A large body of economically oriented work on land use entitlements exists, primarily building on the insights of Coase, *supra* note 1, and Calabresi and Melamed, *supra* note 3. *See, e.g.*, Merrill & Smith, *supra* note 4, at 366-83 (describing these influences on the economic analysis of property rights).

[11] Recent work has, however, given greater attention to the ex ante effects of the legal rules surrounding property entitlements. *See* Stewart E. Sterk, *Property Rules, Liability Rules, and Uncertainty about Property Rights*, 106 MICH. L. REV. 1285, 1287 (2008) (observing that the literature has seen a shift to "ex ante concerns—developing a legal structure that minimizes the risk of conflict before it arises"). The possibility that the assignment and protection of entitlements could affect the likelihood and costliness of later conflict has been explored in, e.g., Lucian Arye Bebchuk, *Property Rights and Liability Rules: The Ex Ante View of the Cathedral*, 100 MICH. L. REV. 601 (2001). *See also* text accompanying notes 48-53, *infra.*

[12] *See, e.g.*, Stewart E. Sterk, *Neighbors in American Land Law*, 87 COLUM. L. REV. 55, 55 (1987) (describing property's "rigid 'geometric box' allocation of rights" as well as some departures from it). Property rule protection over unique assets confers a monopoly power because it gives owners the unqualified right to veto any proposed transaction. *See, e.g.*, Calabresi & Melamed, *supra* note 3, at 1092.

[13] In other words, exclusion gives way to various forms of governance. *See* Henry E. Smith, *Exclusion*

because these overrides are typically insensitive to the actual valuations of the entitlement-holders (which may be quite heterogeneous), they generate new inefficiencies.[14]

By routinely granting broader monopoly power than is useful to owners and making it costless to hold onto, existing property arrangements needlessly impede efficient transactions that could avoid land uses conflicts and the subsequent application of coercive overrides. Meanwhile, legal rules that privilege temporal priority, protect existing uses, and base compensation on actual rather than optimal investments, prompt owners to aggressively barrel towards a future collision.[15] Owners are thus systematically encouraged to hold onto more extensive property-rule-protected packages and use them more aggressively than they would if they internalized the increased accident costs associated with doing so. The results are reminiscent of drivers who choose heavy SUVs to improve their personal crash outcomes without considering the effects of their decisions on the destructiveness of crashes.[16] Although the resulting inefficiencies have not escaped notice, land use conflicts are rarely approached as collisions that might benefit from precautionary changes to property entitlements themselves.

What, then, would it mean for property entitlements to incorporate cost-effective precautions—the ownership equivalent of crumple zones or brake lights? For efficiency's sake, we would want low-valuing users to cede their entitlements to higher-valuing ones in the event of a conflict, preferably through a voluntary market transaction. But by the time such a conflict arises, a bilateral monopoly dynamic has typically taken hold that makes such a transaction uncertain and costly.[17] Scholars have put enormous energy into devising ways to reproduce the desired result, but coercion, whether through liability rules or otherwise, has been an entrenched part of the story.[18] What has received much less attention is the

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Versus Governance: Two Strategies for Delineating Property Rights, 31 J. LEGAL STUD. S453 (2002) These governance mechanisms need not be top-down command-and-control style restrictions (although they do often take that form). For example, liability rules permit an owner's prerogatives to be overridden, at a price, without her consent and thus offer a way around the monopoly blocking power inherent in property rule protection. *See, e.g.*, Calabresi & Melamed, *supra* note 1, at 1092, 1107.

[14] This is a standard concern about eminent domain, but it applies to all liability rules. *See, e.g.*, Richard A. Epstein, *A Clear View of* The Cathedral*: The Dominance of Property Rules*, 106 YALE L.J. 2091, 2093 (1997).

[15] *See* text accompanying notes 28-29, *infra*.

[16] Such problems in the road accident arena are by no means fully addressed by existing tort law, but at least they are recognized at the level of theory. *See, e.g.*, CALABRESI, *supra* note 5, at 136-39 (discussing bumper design as a potential precaution); Warren F. Schwartz, *Objective and Subjective Standards of Negligence: Defining the Reasonable Person to Induce Optimal Care and Optimal Populations of Injurers and Victims*, 78 GEO. L.J. 241, 254, 255-57 (1989) (observing that "one's ability to avoid harm while driving is affected by one's choice of the car's features and one's skill as a driver" and presenting an example involving brake quality).

[17] *See, e.g.*, Sterk, *supra* note 12, at 57-58, 69-74 (describing the bilateral monopoly dynamic that can arise between neighbors and analyzing its effects on transaction costs and the possibility of an efficient bargain); James E. Krier & Stewart J. Schwab, *Property Rules and Liability Rules: The Cathedral in Another Light*, 70 N.Y.U. L. REV. 440, 460-62 (1995).

[18] For some examples of work considering how liability rules (and variations thereon) might be configured

possibility that owners could be induced to identify in advance the low-valued portions of their property packages and release their monopoly grip on those elements before a conflict arises.[19] Designing entitlements to encourage such advance concessions would allow those individual landowners most likely to be the "cheapest cost avoiders"[20] in future conflicts to self-identify and commit in advance to yielding.

To bring this idea down to earth, consider recent conflicts that have arisen between households that wish to grow tall trees and their neighbors who wish to make use of solar panels.[21] Most households do not plan to occlude the "solar corridors" used by their neighbors, yet they lack any method or motivation for conveying those intentions to in-movers who are interested in solar power.[22] Such in-movers could, of course, go door to door in an attempt to negotiate negative easements, but as soon as they raise the question of buying such a right, the dynamic between the parties changes in ways that are unlikely to be conducive to a quick and low-cost resolution. Concerns about this issue have prompted a number of scholars to consider the use of liability rules that would avoid the need for individualized pairwise bargains.[23] Yet again, such approaches focus on resolving conflicts that, in an important sense, are already in progress.

Suppose a local government anticipating this issue offered a specified payment (or, more likely, a property tax reduction) to any household that agreed to make a solar easement available for later unilateral purchase by a neighbor at the then-going rate.[24] Notice that it would not be necessary for the governmental entity to actually buy up the easement in advance; rather, it could acquire an option on the easement and thereby remove the landowner's power to veto a later transaction.[25] The local government

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to address conflicts, see sources cited in *infra* notes 43 and 46. *See also* text accompanying notes 198-199, *infra* (discussing role of compulsion in aggregation efforts).

[19] Using call and put options to overcome monopoly holdout dynamics is familiar within the scholarly literature. However, most of the work does not contemplate using these tools before the onset of a disagreement about uses. An exception is literature considering the advance use of options in the eminent domain context. *See infra* note 31 and accompanying text.

[20] CALABRESI, *supra* note 5, at 136-40; *see also* Christopher Serkin, *Existing Uses and the Limits of Land Use Regulations*, 84 NYU L. REV. 1222, 1272 (2009).

[21] In California, for example, high profile litigation among neighbors on this issue prompted a legislative change. *See, e.g.*, Felicity Barringer, *Trees Block Solar Panels, and a Feud Ends in U.S. Court*, N.Y. TIMES, Apr. 7, 2008 (reporting on the dispute and the court's judgment); Troy A. Rule, *Shadows on the Cathedral: Solar Access in a Different Light*, 2010 U. ILL. L. REV. 851, 874-75 (describing amendments to California's Solar Shade Control Act); *see also* Sara C. Bronin, *Solar Rights*, 89 B.U. L. REV. 1217 (2009) (discussing various approaches to disputes over solar access).

[22] The problem is a general one. As Sterk explains, "a party unaware of potential competing uses is unlikely to initiate negotiations to eliminate conflicts[,]" leaving it to "the encroacher or infringer" to raise the issue. Sterk, *supra* note 11, at 1295.

[23] *See* Rule, *supra* note 21, at 883-92; Sara C. Bronin, *Modern Lights*, 80 U. COLO. L. REV. 881, 910-14 (2009).

[24] The phrase "then-going rate" suppresses a number of complexities that will be discussed below. The basic idea is simple, however: a landowner would voluntarily expose herself to a liability rule regime.

[25] The government's original offer amounts to a put option: households have the right, but not the obligation, to force a sale at the stated price. The subject of this put option—the thing that the government agrees to buy—is a

could then allow any landowner who wishes to make use of a solar collector on an adjacent parcel to obtain and exercise the option to acquire the easement (at the going rate), with proceeds forwarded to the relinquishing landowner. I will expand on this intuitive example below. For now, it is sufficient to note how this arrangement might induce those who place a relatively low value on particular land use entitlements—here, the option to grow tall trees or erect other tall structures—to step forward and receive compensation for returning a measure of flexibility to the common pool.[26] Involving owners in the process of voluntarily customizing their own entitlements offers an opportunity similar to that facilitated in the intellectual property context by Creative Commons licenses, which address a similar problem and likewise seek to reduce transaction costs.[27]

Another way to think about this approach is as a mechanism for countering excessive entrenchment in land use. A large literature on transition relief, as well as on specific manifestations like compensation for takings, analyzes the inefficiencies that may follow from shielding owners from the effects of legal change.[28] For example, there is a moral hazard associated with a just compensation rule that extends to improvements as well as to the land itself, because people do not bear the full costs of their investment decisions.[29] While much of the work in this vein has focused on the merits of revamping or eliminating transition relief by fiat, some scholars have investigated how parties might voluntarily render themselves more vulnerable to later legal change,[30] including through advance sales of options that constrain later compensation.[31] Mechanisms that would allow

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call option on a solar easement. *See infra* Part II.A.

[26] To be sure, the flexibility in question is spatially situated and hence not physically collected in an undifferentiated heap for anyone to draw on for any purpose in any place. Nonetheless, it contributes to a collective fund of flexibility that makes it easier for people to carry out projects involving land. The idea that landowners withdraw flexibility from a social fund is suggested in T. Nicolaus Tideman, *Integrating Land-Value Taxation with the Internalization of Spatial Externalities*, 66 LAND ECON. 341, 347 (1990).

[27] Consistent with this analogy, Creative Commons licenses and similar grants of access to intellectual property have been described as "intellectual easements." R. Polk Wagner, *Information Wants to Be Free: Intellectual Property and the Mythologies of Control*, 103 COLUM. L. REV. 995, 1032 (2003).

[28] *See, e.g.*, DANIEL SHAVIRO, WHEN RULES CHANGE 40-42 (2000); Lawrence Blume & Daniel L. Rubinfeld, *Compensation for Takings: An Economic Analysis*, 72 CAL. L. REV. 569, 571-72 (1984); Kaplow, *supra* note 6, at 527-28; Jonathan Remy Nash & Richard L. Revesz, *Grandfathering and Environmental Regulation: The Law and Economics of New Source Review*, 101 NW. U. L. REV. 1677 (2007); Serkin, *supra* note 20, at 1283-87; *see also* Jonathan S. Masur & Jonathan Remy Nash, *The Institutional Dynamics of Transition Relief*, 85 NYU L. REV. 391 (2010); Jonathan Remy Nash, *Allocation and Uncertainty: Strategic Responses to Environmental Grandfathering*, 36 ECOLOGY L.Q. 809 (2009).

[29] *See, e.g.*, Lawrence Blume, Daniel L. Rubinfeld, & Perry Shapiro, *The Taking of Land: When Should Compensation be Paid?* 99 Q.J. ECON. 71 (1984); William A. Fischel & Perry Shapiro, *Takings, Insurance, and Michelman: Comments on Economic Interpretations of "Just Compensation" Law,* 17 J. LEGAL STUD. 269, 270-75 (1988); Cooter, *supra* note 4, at 19-21; *see also* ROBERT C. ELLICKSON & VICKI L. BEEN, LAND USE CONTROLS: CASES AND MATERIALS 152-53 (3d ed. 2005) (summarizing the moral hazard problem and collecting sources).

[30] Providing "transactional flexibility" through a menu of governmental alternatives incorporating different degrees of transition risk represents one such approach. SHAVIRO, *supra* note 28, at 38-40.

[31] *See, e.g.*, Cooter, *supra* note 4, at 22-23; Fischel & Shapiro, *supra* note 29, at 274-75. *See also* Florenz Plassmann and T. Nicolaus Tideman, *Applying Marginal Cost Pricing: Efficiency and Fairness in Takings and*

individuals to force advance sales of selected elements of their ownership veto powers are a natural extension of these ideas.[32]

Just as safer automobile design does not eliminate the need for speed limits, well-designed roads, or liability consequences, neither would offering landowners greater opportunities to customize their property entitlements operate as a stand-alone solution. Nonetheless, more flexible entitlement design could substitute at least sometimes for more costly precautionary measures, such as blanket bans on particular land uses. Indeed, a significant advantage of the approach I outline here lies in its ability to preserve a greater degree of owner autonomy than a system that depends upon ordinary liability rules to get entitlements out of the hands of low-valuers and into the hands of high-valuers, or that simply bans larger and larger sets of uses. Allowing property owners to consummate land use deals without the interference of a bilateral monopoly dynamic can support higher levels of voluntary transactions and richer property packages.

The analysis proceeds in three parts. In Part I, I show how analogizing land use conflicts to accidents, despite some evident differences, yields useful lessons about the nature of precaution and the alternative paths to achieving it. Here, I explain how the undue rigidity built into standardized property entitlements contributes to conflicts and costly efforts at conflict prevention. Part II examines how precautionary land use entitlements might work in a variety of contexts, starting with the tree-versus-solar scenario introduced above. Specifically, I explore how an institutional alternative—an option exchange—could confront owners with the opportunity costs of their draws against land use flexibility, and thereby reduce land use conflicts. Part III considers how a precaution-based understanding of entitlements fits into ongoing debates about the nature and meaning of property. Here, I anticipate and counter some objections, including concerns about the potential inconsistency of increased entitlement customization with the *numerus clausus* doctrine.

I. THE COSTS OF LAND USE ACCIDENTS

In *The Costs of Accidents*, Guido Calabresi pointed out the fallacy of a single-minded focus on minimizing accidents; the relevant challenge, at least from an efficiency perspective, is to minimize the sum of accident

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Land Assembly, and Accuracy in Assessment, All in One Fell Swoop (2009) available at: http://works.bepress.com/florenz_plassmann/1 (proposing an alternative that involves an integrated system of self-assessed valuation and compensation for placing property at risk of condemnation that is designed to simultaneously address the moral hazard problem, the holdout problem, and the problem of insufficiently deterring governmental takings).

[32] This is especially so given that put options have already been recognized as alternatives to traditional liability rules for the resolution of private land use disputes. *See, e.g.* Ian Ayres, *Protecting Property with Puts*, 32 VAL. U. L. REV. 793 (1998).

costs and prevention costs.[33] The same principle holds true in the land use context.[34] Yet most real-world land use controls prohibit uses in a categorical manner, running up prevention costs with little regard for the overall goal of cost minimization.[35] Efficiency-oriented scholarship on land use conflicts has, in contrast, focused primarily on what might be termed "crash management"—how to most cheaply resolve conflicts that are already in progress.[36] Although a few scholars have given attention to how entitlement design might influence ex ante choices,[37] the full range of mechanisms through which the likelihood and severity of future conflicts might be reduced has yet to be examined. Equally important is the possibility that entitlement design could reduce resort to costly methods of preventing conflicts ex ante, such as strict separations of uses or outright prohibitions. This Part will identify and examine the precautionary gap in existing approaches and explain how attending to the hazards of default property configurations points toward some alternatives.

A. From Road Accidents to Land Use Collisions

Land use conflicts develop over time and typically lack a dramatic focal event analogous to tort law's paradigmatic car crash. What is more, the impacts that result from incompatible land uses are rarely "accidental" in the usual sense; the uses are intended, even if their specific deleterious effects on neighboring parties are not.[38] As an initial matter then, we must consider how (or even if) a land use conflict is like a collision.

1. The Accident Analogy

The "crash-like" aspects of land use conflicts come down to this: the costly collision in time and space of two or more socially valuable but

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[33] CALABRESI, *supra* note 5, at 26. Administrative costs represent an important subset of the overall costs that society seeks to minimize. *Id*. at 28.

[34] *See, e.g.*, Ellickson, *supra* note 5, at 687-91.

[35] Both public controls (zoning) and private controls (covenants) may embody these excesses. *See, e.g.*, Nicole Stelle Garnett, *Unbundling Homeownership: Regional Reforms from the Inside Out*, 119 YALE L.J. 1904, 1906 (2010) ("Since local governments (and private developers) can rarely calibrate the level of regulation to residents' true preferences, ex ante prohibitions frequently impose excessive 'prevention costs.'").

[36] *See* Bebchuk, *supra* note 11, at 602-03 (observing that most work on entitlements and externalities approaches the problem from an ex post perspective that "take[s] as given both the presence of [the conflicting uses] and their potential costs and benefits from their respective activities").

[37] *See id*. at 603 (adopting an ex ante approach that examines how choices about entitlements influences earlier decisions, such as where to locate, what activities to pursue, and how much to invest in them); text accompanying notes 49-53, *infra* (discussing related lines of analysis).

[38] Although the term "intentional" can be used in a variety of ways, its doctrinal meaning in the nuisance context requires only that the defendant carry on an activity known to produce certain effects with substantial certainty; a specific intention to harm the plaintiff is not required. *See, e.g.*, Morgan v. High Penn Oil Co., 77 S.E.2d 682, 689 (N.C. 1953); Jeff L. Lewin, *Comparative Nuisance*, 50 U. PITT. L. REV. 1009, 1027 (1989).

incompatible private land use agendas.[39] Although classification questions abound, it is generally helpful to recognize that a given landowner's plans for her property might collide with those of another owner either because one of the parties undertakes an activity on her parcel that generates a negative spillover (or withdraws a positive spillover)[40] or because one of the owners exercises a blocking veto power over a property input that, due to its precise location in space and time, is essential to the other owner's plans. Land use accidents, then, can be thought of as spatially and temporally sensitive use-thwartings that are produced by the conflicting land use aims of private parties.[41] These thwartings, like the twisted metal and broken bones that ordinary road accidents produce, are undeniably costly—which is not to say that they are always worth the cost of avoiding.

The analogy is helpful because it points to gaps in our understanding of the slate of available precautions. In land use contexts as in road accidents, ex ante regulations and ex post liability are used in various combinations to control the primary behavior of the parties, including decisions about when and where they will be and what they will do while there. Zoning and covenants further structure how land uses interact, acting in part like concrete barriers or road blockades to keep uses apart, and in part like directional signs or lane designations to induce self-sorting.[42] But because land use accidents can be averted by bargains as well as by actions to separate or regulate uses, an owner's decision to make her property entitlements more amenable to future bargains represents another possible precaution. In other words, the veto powers landowners retain can be as hazardous to efficiency as the actions they affirmatively take. Yet little attention is given to how owners' choices about entitlement configuration and strength—the design of the vehicles in which conflicting property rights arrive on the scene—might reduce the costs of land use conflicts and their prevention.

2. Crash Management and Beyond

Many scholars have employed and built upon Calabresi and Melamed's

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[39] Larissa Katz has developed the idea of owners as "agenda setters." Larissa Katz, *Exclusion and Exclusivity in Property Law*, 58 U. TORONTO L. J. 275, 289-93 (2008). I focus here on private land use agendas to distinguish conflicts stemming from landowners' primary behavior from those produced by the actions of governments or other collectives. Governmental intervention is often the result of actual or anticipated difficulties resolving these private conflicts.

[40] Whether a particular impact is understood as a negative spillover or the withdrawal of a positive spillover depends upon societal judgments about the appropriate harm/benefit baseline in use. *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).

[41] They are therefore distinguishable from the more general-purpose agenda-thwartings caused by factors like low wealth or governmental prohibitions.

[42] *See, e.g.*, LEE ANNE FENNELL, THE UNBOUNDED HOME 41-43, 69-70 (2009) (discussing role of land use controls in both restricting land uses and inducing self-sorting).

framework to examine how best to assign and protect contested land use entitlements.[43] But as Lucian Bebchuk's pathbreaking work emphasizes, this scholarship has generally approached the efficiency inquiry from an ex post perspective that takes the existence of the adjacent incompatible uses as a given.[44] Treating a land use dispute as a slow motion wreck highlights the shortcomings of this approach. We would think it odd to focus all our attention regarding the costs of road accidents on deciding which party to a crash should bear the brunt of the impact. Yet the standard economic approach to land use conflicts does something quite analogous.

To see this point, imagine that a roadway collision could be magically slowed down by enough orders of magnitude to permit the parties (through their agents) to resort to the courts after a crash has become inevitable, but before it has been determined how the in-kind costs of that crash (fatalities, injuries, and vehicle damage) will be distributed among the parties. The drivers, let us assume, can still influence that distribution through their actions in the split-seconds before the crash occurs.[45] Suppose the finder of fact determines that the total amount of damage would be minimized by having one driver or the other steer her car (nonfatally, let's say, but catastrophically) into an adjacent brick wall rather than plow head-on into the other party. The court could then choose from Calabresi and Melamed's classic quartet of alternatives by granting either Driver 1 or Driver 2 the entitlement to continue unscathed (and imposing on her opposite number the duty to crash into the wall) and by protecting that entitlement with either a property rule or a liability rule.[46] Such an exercise is not incoherent, yet it

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[43] Foundational pieces written during the quarter-century following *The Cathedral*'s publication include, for example, Symposium, *Property Rules, Liability Rules, and Inalienability: A Twenty-Five Year Retrospective*, 106 YALE L.J. 2081 (1997); Louis Kaplow & Steven Shavell, *Property Rules Versus Liability Rules: An Economic Analysis*, 109 HARV. L. REV. 713 (1996); Ian Ayres & Eric Talley, *Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade*, 104 YALE L.J. 1027 (1995); James E. Krier & Stewart J. Schwab, *Property Rules and Liability Rules: The Cathedral in Another Light*, 70 N.Y.U. L. Rev. 440 (1995); Madeline Morris, *The Structure of Entitlements*, 78 CORNELL L. REV. 822 (1993); A. Mitchell Polinsky, *Resolving Nuisance Disputes: The Simple Economics of Injunctive and Damage Remedies*, 32 STAN. L. REV. 1075 (1980); A. Mitchell Polinsky, *Controlling Externalities and Protecting Entitlements: Property Right, Liability Rule, and Tax-Subsidy Approaches*, 8 J. LEGAL STUD. 1 (1979). Numerous more recent works, some of which are cited and discussed here, have continued to build on the Calabresi and Melamed framework.

[44] Bebchuk, *supra* note 11, at 602-03. As Bebchuk explains, most existing treatments considered the distribution of value between the parties ex post to be irrelevant to efficiency (even if relevant for other normative reasons); in fact, the distribution ex post would have important ex ante impacts on efficiency. *Id.* at 604; *see also* Lucian Bebchuck, *Ex Ante Investments and Ex Post Externalities*, Harvard Law and Economics Discussion Paper No. 397, http://papers.ssrn.com/abstract=297091 (2001) (demonstrating this point formally).

[45] There is empirical support for the possibility that choices made in the midst of a crash can influence within-vehicle patterns of injury and death. *See* Ilya Beylin et al., *Finding Love in the Wreckage: Estimating Spousal Altruism with Data from Fatal Car Accidents* (working paper 2009). That similar choices can affect loss distributions as between the occupants of different vehicles is memorialized in the lyrics of at least one country song. Jimmy Martin, *Widow Maker*, on Jimmy Martin's Greatest Hits (King Records, 2004) (ballad recounting a diesel driver's decision to steer his rig into a ditch, with fatal consequences, to avoid colliding with another vehicle and killing the people therein).

[46] The court might also adopt one of the more esoteric alternatives that scholars have devised to force information—such as decoupled, dual-chooser, or higher-order liability rules. *See, e.g.*, Ronen Avraham, *Modular Liability Rules*, 24 INT'L REV. L. & ECON. 269 (2004); Ian Ayres & Paul M. Goldbart, *Optimal*

puts the emphasis in the wrong place. It frames the efficiency analysis solely in terms of getting the entitlement (here, to emerge from the encounter unscathed) into the hands of the party who valued it most highly, without regard to the parties' earlier actions (such as speeding or driving on the wrong side of the road) that made the crash inevitable.[47] But this is precisely how the efficient resolution of land use disputes is usually framed.

To be sure, several lines of scholarship have moved beyond mere crash management. For example, Bebchuk's work stresses the impact of ex post entitlement assignment and protection on ex ante location and activity choices.[48] Closely related are analyses of doctrines like "coming to the nuisance" that influence future adjacency between incompatible uses.[49] Another important strand of the literature addresses the incentive effects of transition relief, including compensation requirements—issues that Robert Cooter has incorporated into a larger "model of precaution."[50] Other work has examined how altering components of the property bundle, such as alienability, can have ex ante effects on acquisition choices.[51] The possibility that entitlement configuration could have repercussions into the future has also featured in scholarship considering the impact of certain kinds of fragmentation or alienability-limiting provisions.[52] Another interesting and relevant line of analysis examines how different entitlement regimes influence the gathering and use of information in managing conflict.[53]

Despite these important contributions, property theorists have not yet fully come to terms with how entitlement design influences the prospects

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Delegation and Decoupling in the Design of Liability Rights, 100 MICH. L. REV. 1 (2001); Sergey I. Knysh, Paul M. Goldbart & Ian Ayres, *Instantaneous Liability Rule Auctions: The Continuous Extension of Higher-Order Liability Rules* 48 (Sept. 2004) (unpublished manuscript).

[47] Of course, the negligence standard typically applied in tort law regularly fails to examine important sets of ex ante choices about activity levels. *See* STEVEN SHAVELL, ECONOMIC ANALYSIS OF ACCIDENT LAW 21-26 (1987). Ideally, we would want people to make efficient choices along all margins, including the choice to be on the road in that time and place and in that sort of vehicle.

[48] Bebchuk, *supra* note 11.

[49] *See, e.g.*, Donald Wittman, *First Come, First Served: An Economic Analysis of "Coming to the Nuisance,"* 9 J. LEGAL STUD. 557, 558 (1980); Robert Innes, *Coming to the Nuisance: Revising* Spur *in a Model of Location Choice*, 25 J. L. ECON. & ORG. 286 (2009). Location choice, along with building decisions, might be understood as a type of "durable precaution" that raises interesting issues about optimal transition policy. *See* Steven Shavell, *On Optimal Legal Change, Past Behavior, and Grandfathering*, 37 J. LEGAL STUD. 37, 74-77 (2008) (discussing "durable precautions" and grandfathering in the context of land use).

[50] Cooter, *supra* note 4, at 19-21; *see supra* note 28 and accompanying text.

[51] *See, e.g.*, Susan Rose-Ackerman, *Inalienability and the Theory of Property Rights*, 85 COLUM. L. REV. 931, 943 (1985); Lee Anne Fennell, *Adjusting Alienability*, 122 HARV. L. REV. 1403 (2009).

[52] *See, e.g.*, Robert C. Ellickson, *Property in Land*, 102 YALE L.J. 1315, 1374 (1993); Frank I. Michelman, *Ethics, Economics, and the Law of Property*, in NOMOS XXIV: ETHICS, ECONOMICS, AND THE LAW 3, 15-16 (J. Roland Pennock & John W. Chapman eds., 1982); Michael A. Heller, *The Boundaries of Private Property*, 108 YALE L.J. 1163, 1176-82 (1999).

[53] *See, e.g.*, Henry E. Smith, *Property and Property Rules*, 79 N.Y.U. L. Rev. 1719 (2004) (emphasizing the role of information in addressing and coordinating conflicting uses and noting that property systems can be set up with "access-based" rules that place informational and coordination responsibilities on the owner or with "use-based" rules that require officials to gather information); Sterk, *supra* note 11, at 1288-89, 1295-97 (discussing the possibility that property rules will induce excessive search).

and costs of land use conflicts. While scholars have devised increasingly sophisticated mechanisms for making what amount to intra-crash right-of-way decisions, they have neglected the land use equivalents of crumple zones, safety glass, brake lights, and turn signals. To see how and why such features might be added, it is necessary to consider how property currently works.

B. Property Blocks

"Property blocks" (considered both as a noun and as a short declarative statement) offers a two-word starting point for understanding property and a springboard for thinking about precautionary entitlement design.

1. Excess Capacity and Crumple Zones

Property law issues owners standardized blocks of monopoly control that dramatically reduce the choices available to nonowners within a specified spatial domain. As Henry Smith has emphasized, this configuration allows owners to choose among a broad range of uses and activities.[54] But it also carries a significant and largely unrecognized cost that can best be understood as a form of excess capacity[55] in the domain of land use flexibility. Whether measured in terms of space, intensity, or time, most owners only use a fraction of their property entitlements. For example, residential owners frequently fail to use the full "envelope"[56] of airspace that the prevailing legal regime leaves open to them. Yet owners typically retain property rule protection over the ownership block in its entirety until an issue arises—which is to say until a conflict is already in view or in progress.[57]

The point is not that property is being underutilized in the ordinary sense; I am not suggesting it would be optimal for owners to trade their extra scraps of entitlements with each other until every square inch of space is being actively used at every moment in time. Rather, the unused portions

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[54] *See generally* Smith, *supra* note 53; *see also* Part III.B.1

[55] The notion of harnessing "excess capacity" in a variety of contexts through nonmarket sharing rather than through market transactions is explored in Yochai Benkler, *Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a Modality of Economic Production*, 114 YALE L.J. 273 (2004). One of the examples he discusses involves real property: an owner can share her land with hikers and hunters in some areas by simply not posting or fencing. *Id.* at 307-08. In other land use contexts, however, the inability to easily communicate one's intentions combine with a lack of shared norms to require somewhat more formal institutional arrangements. *See supra* Part I.B.3 (describing the communications challenges that certain use rights present). This is especially true where long-run investments by a landowner are at issue that may outlast a given neighbor's tenure (or, perhaps, her inclination toward generosity). *See, e.g.*, Rule, *supra* note 21, at 853 (noting that it can take twenty years or more to recoup the cost of solar collectors, even when incentives are offered).

[56] For the idea of an owner's full set of development rights as an "envelope" or "three-dimensional mold," see, e.g., ELLICKSON & BEEN, *supra* note 29, at 165.

[57] *See, e.g.*, Sterk, *supra* note 11, at 69-74.

of ownership bundles should be viewed as buffers or cushions that, if identified, could help coordinate land uses, avoid conflicts, and accommodate changes. In other words, there is plenty of space within existing property entitlements to build in crumple zones—entitlements that are engineered in advance to yield to a more highly-valued incompatible use.

Ordinary liability rules can accomplish this result in theory, but they may be unsuitable where valuations vary widely among owners,[58] or where the unilateral transfer of entitlements is deemed normatively undesirable. In tight-knit communities, norms that eliminate "hard bargaining" may help to provide the equivalent of such conflict-reducing buffers.[59] Other approaches that rely on an owner's obligation towards others might produce similar results.[60] But where shared norms or a consensus about the applicable obligations are lacking, or where heterogeneous valuations make such norms or obligations problematic to apply, some other approach is required. The basic idea pursued here is to elicit advance relinquishments of veto powers as to superfluous or low-valued components of individual owners' property packages.

2. Unsafe at Any Speed: Why Property Is Such a Drag

To illustrate the potential costliness of safety measures, Calabresi offered the example of cars "built like tanks" that can only go ten miles an hour.[61] While this design configuration would all but eliminate serious road accidents, it would also largely erase any gains that cars might otherwise have introduced.[62] Contemplating the stickiness in land uses produced by the combination of hard-edged property rights and categorical land use controls raises the question of whether we have created a similarly sluggish and unresponsive system of property in land. The question may at first seem incoherent. Land is immobile, and property rights are generally

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[58] *See, e.g.*, Smith, *supra* note 53, at 1774-81 (noting risks of undercompensation and overcompensation when liability rules are used).

[59] *See, e.g.*, ROBERT C. ELLICKSON, ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES 88-89 (1994) (observing that a norm of proportionality in paying for fencing "sharply truncates the range of permissible bargaining positions and hence promises to expedite transactions"); *see also* Sterk, *supra* note 12, at 95-96. I thank John O'Hara for raising this point.

[60] *See, e.g.*, JOSEPH WILLIAM SINGER, THE EDGES OF THE FIELD: LESSONS ON THE OBLIGATIONS OF OWNERSHIP 49 (2000) (describing religious obligations to leave the gleanings at the edges of the field open to all takers); Gregory S. Alexander, *The Social-Obligation Norm in American Property Law*, 94 CORNELL L. REV. 745 (2009) (arguing that property law should – and to some extent does – recognize a social-obligation norm that promotes "human flourishing"); *see also* Part III B.3 (discussing how an "abuse of right" doctrine treats certain ways of deploying ownership as inconsistent with owners' property packages). In some cases, owners' obligations are clear. For example, the doctrine of necessity provides a context in which owners owe duties and consequently lack certain prerogatives.

[61] CALABRESI, *supra* note 8, at 9. Calabresi also considers the alternative of a "racing car" design that would nonetheless move at a snail's pace, but the "tank" offers a more striking image for present purposes.

[62] *Id.*

designed to protect expectations and promote stability. On this account, the very inertia that would be a serious drawback in a product designed to deliver mobility might seem like an appealing advantage, or possibly the entire point, of an institution like property.[63] Owners' veto powers, which are a function of the property rule protection that generally accompanies ownership, do a great deal to reduce conflicts and encourage productive investment.[64] Much of the value associated with property rule protection passes unnoticed as members of society routinely comply with the *in rem* duties to "keep off" that the property rights of others impose on them.[65] Thus, ownership stops fights over resources before they start and sets the stage for trade.[66]

Property can provide these benefits, however, only by drawing from a limited societal store of spatial and temporal flexibility. By giving owners the right to refuse transactions, efficient changes in land use can be blocked. As a result, ownership carries with it an often unacknowledged externality—spatial rigidity.[67] The primary difficulty, as commentators have noted, is not that elements of the built environment can never be undone (they can be, at a price), but rather that accompanying legal protections make change cumbersome and costly.[68] Stripping away those protections presents difficulties of its own, as the controversies surrounding the law's most heavy-handed flexibility restorer, eminent domain, well illustrate. Significantly, the ossification that property rights introduce into metropolitan land use systems often exceeds the level of stability that owners require to pursue their ends. The challenge, then, is to price the draws that owners make against future land use flexibility without nullifying the advantages of property itself.

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[63] Property is generally regarded as an inertial institution. *See, e.g.*, Eduardo M. Peñalver, *Land Virtues*, 94 CORNELL L. REV. 821, 830-32 (2009).

[64] *See, e.g.*, Timothy Besley, *Property Rights and Investment Incentives: Theory and Evidence from Ghana*, 103 J. POLIT. ECON. 903 (1995); Erica Field, *Property Rights and Investment in Urban Slums*, 3 J. Eur. Econ. Assoc. 279, 280 (2005).

[65] *See, e.g.*, Merrill & Smith, *supra* note 4.

[66] *See, e.g.*, Carol M. Rose, *The Several Futures of Property: Of Cyberspace and Folk Tales, Emission Trades and Ecosystems*, 83 MINN. L. REV. 129, 131 (1998).

[67] *See, e.g.*, Tideman, *supra* note 26, at 347 (proposing a tax on the right to remain on a given site that would amount to "a charge for the diminution of social flexibility that results from putting immobile improvements on land").

[68] *See* E. D'Arcy & G. Keogh, *Towards a Property Market Paradigm of Urban Change*, 29 ENVIRON. & PLANNING A 685 (1997) (observing that while the existing stock of buildings influences urban development, the property rights bound up in those buildings also constitute "potentially important constraints on urban change"); Julia D. Mahoney, *The Illusion of Perpetuity and the Preservation of Privately Owned Lands*, 44 NAT. RES. J. 573, 595 (2004) ("Although discussions of the reversibility of land use choices tend to focus on the problems associated with reconfiguring the physical world, in a number of instances institutional considerations are likely to prove the greater impediment to undoing decisions involving land."). There may be a tendency to overestimate the permanence of the building stock itself. *See* Jonathan Hiskes, *Cities Get Rebuilt More Often Than You Think*, GRIST, Jan. 22, 2010 (citing prerecession empirical work by Architecture 2030 predicting that "by the year 2035, three-quarters of the building stock will be new or renovated").

3. Communication Blocks: Fences and Turn Signals

Property, as Carol Rose has emphasized, is significantly about communication—hence the widespread use of fences, stakes, and other markers that are wholly ineffective at physically precluding entry.[69] Despite centuries of change and increasing interdependence among land uses, property has mostly stuck with a simple, gruff message: "keep off."[70] This blunt command does a very effective job of avoiding disputes over who is privileged to be on the land, but does little to coordinate potentially incompatible uses that do not involve physical invasion.[71] Revisiting the notion of excess capacity will help to clarify. The unused portions of landowners' property envelopes do a poor job of communicating an owner's intentions for the space. Of course, people can consult zoning maps and recorded covenants to learn how present uses might be expanded without running afoul of current law, and we can imagine ways to improve salience of the regulatory information available to the public.[72] Yet even these advances would not tell us the value that the landowner places on options to use presently unused portions, or whether she stands willing to sell them.[73]

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[69] *See, e.g.*, Carol M. Rose, *Possession as the Origin of Property*, 52 U. CHI. L. REV. 73, 81-88 (1985) (examining how property involves communication using a shared language); see also Sterk, *supra* note 11, at 1315 (noting that "an owner who marks off property rights provides information to the universe of potential users").

[70] *See, e.g.*, Smith, *supra* note 53, at 1759 ("Typically, things are defined in a rough exclusion-like way, and this sends a simple message to the world to 'keep off.'"). Of course, property does know how to say a number of other things (through the use of easements, for example), but it usually lacks any motivation to speak up until an argument or negotiation is underway.

[71] One way that property rules might be thought to reduce conflicts is by inducing anyone interested in a conflicting use to get in touch with the owner and bargain to a solution. *See, e.g.*, Sterk, *supra* note 11, at 1295 ("Property rules enable the 'owner' of a resource to serve as a clearinghouse for information about the values potential users attach to that resource.") (citing Smith, *supra* note 53, at 1728-29); Rose, *supra* note 69, at 82 ("if I keep my property claims clear, others will know that they should deal with me directly if they want to use my property"). In other words, it might seem unnecessary for property itself to speak if owners can listen. There are at least two problems, however. First, there may be high search costs in figuring out who owns what in order to even initiate a bargain. *See* Sterk, *supra* note 11, at 1296. Second, the bargaining itself may present a bilateral monopoly problem. *See* Sterk, *supra* note 12, at 58-59. My approach suggests that the owner may be better at defining the bounds of her own entitlement and worse at being a "clearinghouse" than existing accounts suggest, which would leave room for gains from delegating the former to the owner but outsourcing the latter to a collective entity.

[72] *See* Hannah Wiseman, *Public Communities, Private Rules*, 98 GEO. L.J. 697, 762 (2010) (discussing the need for better "visual cues" for various types of "rule-bound communities"). For example, computer-generated representations of a home or building's property envelope could be incorporated into a GPS-driven application for a smartphone for on-site viewing. GPS-enabled applications for smartphones already exist that can display nearby properties for sale and three-dimensional renderings of buildings; new "augmented reality" applications could layer on additional regulatory information.

[73] Note that alienating one's option to make use of, say, one's airspace is different from selling the airspace itself to someone else, or even transferring rights to affirmatively use it. Someone might greatly value keeping the space around and above her home open, but place little value on using the space herself. *See* STUART BANNER, WHO OWNS THE SKY? THE STRUGGLE TO CONTROL AIRSPACE FROM THE WRIGHT BROTHERS ON 255 (2008) (noting this distinction in the context of airplane overflights); *see also* Troy A. Rule, *Airspace in a Green Economy*, 59 UCLA L. REV. (forthcoming 2011), available at http://ssrn.com/abstract=1782071, draft at 24-25 (discussing rival and nonrival uses of airspace). Affirmative and negative easements (or covenants) allow these distinctions to be drawn with precision.

One way that owners could be induced to communicate something about their plans and valuations would be to apply a "use it or lose it" rule. But forcing owners to build up and out to the full extent of their property packages, on pain of losing their right to do so, encourages wasteful and poorly-timed expansions.[74] If the goal is communication, this is like requiring landowners to communicate through gold-plated billboards. That the law's protection of existing uses provides inducements toward such costly communication likely represents a significant source of inefficiency.[75] Another possibility would be to presumptively remove an owner's rights under specified circumstances of nonuse but permit a clear communication to undo that presumption.[76] This is one way to understand the law's treatment of easements that arise by operation of law,[77] as well as adverse possession.[78] In certain circumstances, these "speak up or lose out" rules can avoid stripping higher valuers of entitlements while assigning entitlements in the way that will usually maximize value.[79] But such rules must navigate between becoming traps for the unwary (or inertial or underlawyered)[80] and making the opt-out meaningless as a signal of value. Simply allowing owners to reserve all manner of rights through a single communication would do little or nothing to separate high valuers from low valuers.[81]

What is missing, then, is a less wasteful way for owners to credibly communicate their valuations and intentions.[82] An option-based approach that confronts owners with the opportunity costs of holding veto power offers one alternative.[83] Such an approach can serve much the same

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[74] The analysis here is the same as in other contexts where first-in-time rules produce costly races. *See, e.g.*, Wittman, *supra* note 49; Nash, *supra* note 28 (explaining how a first-possession rule for grandfathered rights "creates an incentive for societal actors to engage in a race to capture future resource access, on top of the then-existing race to capture the resource itself"); David A. Dana, *Natural Preservation and the Race to Develop*, 143 U. PA. L. REV. 655 (1995) (discussing incentives for "property owners to accelerate development in order to avoid [uncompensated] regulatory losses from future preservation regulation").

[75] *See* Serkin, *supra* note 20, at 1283-86.

[76] *See* Sterk, supra note 12, at 96.

[77] *See* Sterk, supra note 12, at 96 (discussing settings in which the law assumes "a background duty to cooperate that can be limited or shed only if the landowner makes the appropriate communications").

[78] One need not actually use one's land to avoid losing it to adverse possession; it is sufficient to monitor the property and undertake appropriate and timely steps to eject interlopers. *See, e.g.*, Thomas W. Merrill, *Property Rules, Liability Rules and Adverse Possession*, 79 NW. U. L. REV. 1122, 1130 (1985).

[79] For example, Sterk suggests that certain kinds of easements are allowed to arise by operation of law in order to avoid bilateral monopoly problems, based on the assumption "[t]hat the right involved is of little value to the nonresponding landowner." Sterk, *supra* note 12, at 99 n. 150.

[80] Even when opting out is easy, default rules tend to stick. *See, e.g.*, James J. Choi, David Laibson, Brigitte C. Madrian & Andrew Metrick, *Passive Decisions and Potent Defaults*, in ANALYSES IN THE ECONOMICS OF AGING 59 (David A. Wise ed., 2005). Other things equal, the harder it is to learn about and fulfill the opt-out conditions, the more likely the default rule will fail to reflect the owners' true preferences.

[81] In other words, the opt-out fails as a signal of value when it is no longer "costly to fake" one's status as a high valuer. *See* Robert H. Frank, *Passions Within Reason* 99-102 (1988).

[82] The problem of determining relative valuations is a very general one that has received a good deal of scholarly attention. For a recent survey of several methods for eliciting or inferring valuations, see generally Daphna Lewinsohn-Zamir, *Identifying Intense Preferences*, 94 CORNELL L. REV. 1391 (2009).

[83] This is the flip side of a permitting approach, which likewise allows a party to choose between cash and an

function as turn signals or brake lights by providing reliable information about intentions and thereby facilitating coordination. To appreciate the gap that it would fill, however, it is necessary to first consider the extent to which traditional land use controls can serve either as substitutes for this sort of fine-grained communication, or as communication platforms that enable people to "speak with their feet."[84]

C. Land Use Controls as Precautions

While law and economics has focused on ex post entitlement choices, land use control on the ground has typically employed extensive ex ante restrictions implemented through zoning and private covenants. Although a variety of motives drive land use restrictions,[85] they are at least sometimes designed to do exactly what they suggest—prevent conflicts produced by incompatible adjacent land uses.[86] Both public and private land use controls forestall conflicts largely by separating uses or privileging particular types of uses;[87] the ex ante regulatory regimes that such controls establish can influence both behavioral and locational choices.[88] It might seem that these controls reshape property entitlements in precisely the precautionary manner that I am proposing. Private covenants might seem to hew especially closely to the model of customized entitlements I am advocating, since these instruments (at least on the most optimistic interpretation) involve conscious ceding of certain property rights in order to achieve a more harmonious coexistence with one's neighbors. But there are some important differences that are best illustrated by starting with an examination of what traditional land use controls do best.

If we were certain that a given type of land use conflict would always be most efficiently resolved by granting nonowners control over a particular element of the ownership bundle, then zoning or other forms of collective

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option to develop the property in a particular way. *See, e.g.*, Jonathan Remy Nash, *Trading Species: A New Direction for Habitat Trading Programs*, 32 COLUM. J. ENVTL L. 1, 11 (2007) ("A permit system allows the owner to retain a permit and thus retain value even if the owner does not develop immediately in order to maximize economic efficiency.").

[84] The idea that citizens "vote with their feet" by selecting among local governments is associated with Charles Tiebout, *A Pure Theory of Local Expenditures*, 64 J. POLIT. ECON. 416 (1956).

[85] *See, e.g.*, William T. Bogart, *"What Big Teeth You Have!": Identifying the Motivations for Exclusionary Zoning*, 30 URBAN STUD. 1669 (1993).

[86] *See. e.g.*, Innes, *supra* note 49, at 288 (describing difficulties in determining efficient initial locations and observing that "[t]his inherent problem with ex-post liability/property rules may motivate the use of zoning powers to regulate ex-ante location decisions.").

[87] Cumulative ("Euclidian") zoning does not actually keep incompatible uses apart so much as it insulates less intensive uses from more intensive uses; the less intensive uses can still locate in more intensive zones. *See* ELLICKSON & BEEN, *supra* note 29, at 90-91 (describing how cumulative zoning works).

[88] *See, e.g.*, FENNELL, *supra* note 42, at 123-26 (discussing "membership effects" and "compliance effects"); Michael J. Pogodzinski & Tim R. Sass, *The Economic Theory of Zoning: A Critical Review*, 66 LAND ECON. 294, 295 (1990) (distinguishing "direct" effects of land use controls from effects on mobility).

regulation could easily accomplish that result on a wholesale basis.[89] An owner's block of property could simply be trimmed back along any number of dimensions, excising those entitlements that are presumptively more highly valued by someone else. For example, the law's decree that landowners cannot exclude ordinary aircraft overflights can be characterized as having truncated the column of airspace that owners were previously thought to have under the *ad coelum* doctrine.[90] Similar considerations can explain doctrines and legislation involving "spite fences" and other instances of gratuitously inflicted harm. Here the trimming takes place along a conceptual line defined by motivations rather than a spatial dimension, but the curtailment is likewise premised on a judgment that the owner's interests (here, in spiting her neighbor) are decisively outweighed by the neighbor's interest in avoiding a spiteful harm.[91]

Blanket prohibitions work less well when society is not confident in its assessment that one conflicting use is (or, for normative reasons should be treated as) invariably the lower-valued one. It is important not to overstate this point. First, some generalizing may be in order to conserve on the administrative costs of running a land use system. Moreover, mechanisms might be layered onto blanket land use controls to selectively undo certain restrictions by facilitating bargaining or emulating its results.[92] Even if such mechanisms fail to develop in ways that provide appropriate tailoring, across-the-board prohibitions that are highly localized present fewer concerns, if multiple regulatory regimes within the same general area exist in sufficient variety to permit sorting.[93] Choosing among an array of communities in which private ownership rights have been whittled away in various combinations allows for customizing one's own entitlement to remove the less-valued components, in exchange for gaining control over the less-valued components of other owners.[94] Yet even if sorting operated

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[89] Felix Frankfurter described legislative lawmaking as "wholesale" and judicial as "retail." Joseph P. Lash, *A Brahmin of the Law*, in FROM THE DIARIES OF FELIX FRANKFURTER (1974). The option exchange described here offers an institutional alternative that permits "retail" adjustments without judicial involvement.

[90] For a comprehensive account of how the law regarding overflights developed, see BANNER, *supra* note 73. In fact, the geometric shape that fits with a strict interpretation of the *ad coelum* doctrine is not a column but rather a wedge or cone, given the curvature of the earth. *See id.* at 17 ("If a man owned what looked like a circular parcel of land, one American lawyers' magazine explained in the 1860s, his true holding was shaped like a cone, with its apex at the center of the earth and its base at some undefined height.").

[91] The spiter may, in fact, derive great utility from her aesthetic outburst, but society makes a judgment that enjoyment of harm caused to others does not count when determining which of two competing valuations society will privilege. *See also infra* Part III.B.3 (discussing spite fences in the context of abuse of right).

[92] An alternative approach suggested by Michelle White and Donald Wittman is "zoning-based liability rules" under which "[p]olluters are allowed to locate in any zone" but "they are strictly liable for damages when located in the wrong zone, while liability is based on negligence when they are in the right zone." Michelle J. White & Donald Wittman, *Optimal Spatial Location Under Pollution: Liability Rules and Zoning*, 10 J. LEGAL STUD. 249, 266 (1981).

[93] *See* Tiebout, *supra* note 84. In addition to multiple jurisdictions within metropolitan areas, common interest communities continue to proliferate, offering ever-expanding opportunities for like-minded households to group up and fine-tune their property bundles to suit their fancy.

[94] Of course, people can't always find an ideal community featuring precisely the mix of entitlements that

well to address heterogeneous valuations (and there is reason to think it may not)[95] traditional land use controls may still fall short in two ways.

First, land use controls do not provide a mechanism for landowners to transact over future flexibility, before it is needed. Although controls operate prospectively, they move entitlements around in real time instead of transferring options to later rearrange entitlements. Even when the more distant future is expressly contemplated, land use controls typically make later transactions harder rather than easier—perpetual conservation easements are a prime example.[96] This omission may not seem especially glaring or important at first; transacting over future flexibility sounds rather esoteric and alien. But that is only because property arrives in pre-formed standardized blocks that mask the embedded, low-valued inflexibility that owners tend to unreflectively consume.[97] We ordinarily defer purchasing things that we do not yet need, and public policy has routinely pushed back against attempts to monopolize a supply, such as water, that exceeds one's usage.[98] Why, then, would we configure property in land to encourage the opposite approach, by making it difficult for owners to do anything other than hold monopoly power over low-valued elements or transfer the interest outright?

Second, traditional land use controls offer "customization" of a fairly lumpy, off-the-rack variety that applies across an entire neighborhood or zone. The problem is not just that the restrictions may be ill-fitting for certain individuals (although this may certainly be the case); it is that the system as a whole assumes that identical restrictions among neighbors are complements rather than substitutes. Another way of putting the point is to observe that collectively applied land use controls demand that payment for another landowner's land use concessions be made in kind through reciprocal concessions of one's own land use rights. While this may be efficient in a given case, there is reason to suppose that some land use conflicts are best resolved through different restrictions that apply on different parcels within an area. New forms of renewable energy are just one case in point: across-the-board tree restrictions would allow solar power

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they most prefer, but perhaps they can do well enough. *See, e.g.*, FRED FOLDVARY, PUBLIC GOODS AND PRIVATE COMMUNITIES 71 (1994).

[95] In earlier work I have considered the shortfalls of sorting, as well as some ways that mechanisms for fine-tuning land use controls might address valuation heterogeneity. *See* FENNELL, *supra* note 42, at 35-38, 67-119.

[96] For a critique, *see* Julia D. Mahoney, *Perpetual Restrictions on Land and the Problem of the Future*, 88 VA. L. REV. 739 (2002).

[97] The metaphorical representation of property as a solid cube corresponding to a square of land may contribute to this difficulty. *See* Jeanne Schroeder, *Death and Transfiguration: The Myth that the U.C.C. Killed "Property,"* 69 TEMPLE L. REV. 1281, 1339-41 (1996) (proposing the alternative metaphor of liquid to represent property); Carol M. Rose, *Property as the Keystone Right?*, 71 NOTRE DAME L. REV. 329, 351 (1996) (considering how our understanding of property might change if its "central symbol" were water rather than land).

[98] *See, e.g.*, Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919 (1998); Sandra Zellmer, *The Anti-Speculation Doctrine and Its Implications for Collaborative Water Management*, 8 NEV. L.J. 994 (2008).

to thrive, but communities might be more pleasant if they incorporated a workable mix of shade trees and solar power collectors.

Importantly, the entitlement concessions I discuss here need not represent additional incursions layered on top of traditional land use controls. Instead, a voluntary system for the advance concession of veto rights could make it feasible for owners to retain larger sets of entitlements until a competing use arises, while yet avoiding the fallout from outright conflict. Just as cars in adjacent lanes need not be strictly separated with concrete dividers if they can find ways to change lanes without hitting each other, so too might categorical prohibitory land use controls become less necessary if other ways of avoiding conflicts were popularized. Notice also that enabling landowners to effectively return flexibility to the common pool by ceding veto rights has very different effects on the inertia levels of the overall property system than does an outright restriction on uses. Where traditional land use controls ossify, advance concessions of flexibility do the opposite.

II. PUTTING PRECAUTION INTO PROPERTY

As the discussion above has emphasized, property's blocky, inflexible nature contributes to costly conflicts among land uses. It also heightens the need to resort to coercive government actions. This Part examines mechanisms for injecting greater flexibility into property rights over time, with special attention to the potential use of a local land use option exchange.[99] Such an exchange could lower the costs of land use bargains between landowners by inducing the precautionary concession of veto rights over property entitlements. Subpart A illustrates the basic workings of an option exchange using the example introduced at the beginning of the paper: a conflict between a neighbor who wishes to grow tall trees and a neighbor who wishes to use solar panels. Subpart B examines several ways the idea could be extended and elaborated to address different factual conditions, including the need to assemble a number of spatially proximate entitlements. Subpart C considers two refinements that might affect the feasibility and palatability of the family of approaches discussed here: a deposit-refund feature, and self-assessed valuation.

[99] The idea is similar in concept to a bank, but I use the term exchange to emphasize that those making deposits and those making withdrawals are often not the same people. The exchange term also helps to distinguish the ideas here from other conceptually related but distinct institutional alternatives. *See, e.g.*, MITIGATION BANKING: THEORY AND PRACTICE (Lindell L. Marsh et al., eds. 1996) (edited volume addressing public and private banking arrangements to accomplish mitigation of harms to wetlands and other habitats); JAMES S. COLEMAN, FOUNDATIONS OF SOCIAL THEORY 267-69 (1994) (describing an "action-rights bank" into which people would deposit the right to control a given action, and which would issue shares that could be purchased to determine the outcome).

A. A Simple Example: Optioning Sunlight

To see how a precautionary concession of veto rights might work, it is helpful to start with a simple and concrete example: two neighbors' incompatible plans for a solar corridor.

1. Solar Access Versus the Mighty Sequoia

Suppose two neighboring households, the Treetons and the Solshines, find themselves clashing over solar access.[100] The Treetons planted a row of young sequoia trees ten years ago. A few years later, the Solshines moved in next door and promptly installed large solar panels along their roof, which they use to provide power to their home. At that time, the Treetons' sequoias were not tall enough to interfere with the Solshines' solar collection. However, the trees have since doubled in height and have begun to reduce the effectiveness of the Solshines' solar panels. Moreover, unless something is done about the trees, they will keep on growing (their height at maturity may exceed 200 feet) creating ever-greater interference with the Solshines' sunny plans. The conflict is an interesting one, not least because it pits two environmentally favored uses against each other.[101]

There are two obvious ways to avoid this conflict, each of which carries a serious disadvantage. First, one use could be privileged over the other, at least within a particular geographic scope. Trees or other structures over a certain height might simply be banned, or, alternatively, solar power collectors might be either outlawed or permitted solely at the user's risk, with no recourse for blockages. Such a solution's efficiency depends on planners getting things right, so that each use trumps where, and only where, it is more valuable than the competing use. Yet even the most benevolent planners are likely to lack information, and even if they have all currently available information, they will be uncertain about how things will play out in the future. A second possibility is to simply make property rights (here, the rights over the airspace through which sunbeams would travel) very clear and let parties bargain over them. But, as already discussed, the transaction costs associated with this possibility are likely to be prohibitive. Even if the Treetons and the Solshines are the only people involved and already live next door to each other, they are locked in a bilateral monopoly. Deciding where to locate based on the unknown plans of multiple other parties is even more daunting.

It is unsurprising that legal scholars have gravitated toward liability

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[100] Although I focus on solar access, the same analysis would apply if a view were at stake. Additional types of conflicts are considered *infra* in Part II.C.

[101] *See, e,.g,* Barringer, *supra* note 21 (calling the conflict an "eco-parable" with "environmental virtue" on both sides of the fence).

rules in an effort to avoid the twin risks of inflexibility and high transaction costs.[102] Yet ordinary liability rules present difficulties of their own due to the unilateral nature of the transactions they facilitate. In their standard "call option" incarnation, a liability rule permits one party to force another to sell. A "put option" conversely allows one party to force the other to purchase. Although a put option involves an equally involuntary imposition on the buyer as the call option places on the seller, the normative cast changes if we put a governmental entity into the role of forced purchaser.[103] While stand-alone governmental put options are certainly possible,[104] a governmental put could be an especially valuable component in an option exchange that pairs temporally offset sellers and buyers. Such an exchange could facilitate transactions that are both entirely voluntary and yet free of the bilateral monopoly dynamic that often afflicts deals between neighbors. The next section explains.

2. An Option Exchange for Solar Easements

Suppose the fictitious city of Hedgerow is aware that some of its residents (Type 1) might like to plant tall trees or erect large, permanent structures, while others (Type 2) might wish to engage in uses that depend on certain of their neighbors *not* installing any such foliage or fixtures.[105] Each Type contains both those who place a high value on their plans (Types 1H and 2H) and those who place a low value on those plans (Types 1L and 2L). Because the Hedgerowians are an uncommunicative lot, none of them

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[102] *See* Rule, *supra* note 21, at 883-92; Bronin, *supra* note 23, at 910-14.

[103] As Smith discusses, we do not generally see *in rem* put options that obligate the public at large to buy entitlements. Smith, *supra* note 53, at 1794-95. While there are some narrow instances in which people can be made to pay for unrequested benefits, these are strictly limited. *See, e.g.*, Smith at 1795; Ariel Porat, *Private Production of Public Goods: Liability for Unrequested Benefits*, 108 MICH. L. REV. 189 (2009) (critiquing current narrow scope of liability for such unrequested benefits). To be sure, a put option written by the government collectively obligates the populace to engage in the forced purchase; however, the coercion involved is that ordinarily attending taxation and subject to a different set of political controls than one-on-one forced purchases would be.

[104] The "Cash for Clunkers" program operated by the government in the summer of 2009 offers a recent and much-critiqued example of a governmental put; motorists could force the government to purchase (for destruction) specified fuel-inefficient vehicles for a credit against certain new vehicle purchases. *See* Atif R. Mian & Amir Sufi, *The Effects of Fiscal Stimulus: Evidence from the 2009 "Cash for Clunkers" Program* (September 2010) http://ssrn.com/abstract=1670759 (studying the impact of the program). For some other examples, see Morris, *supra* note 43, at 854–55 (discussing gun buybacks as puts); John Quiggin, *Repurchase of Renewal Rights: A Policy Option for the National Water Initiative*, 50 AUSTRALIAN J. OF AGRICULTURE AND RESOURCE ECON. 425 (2006) (examining potential for repurchase of certain renewal rights for irrigation licenses); Michael C. Blumm & Joshua D. Smith, *Protecting the Columbia River Gorge: A Twenty-Year Experiment in Land-Use Federalism*, 21 J. LAND USE & ENVTL. L. 201 (2006) (examining the "opt-out" provision for Special Management Areas, which involved a variation on a put option: during a limited period, landowners subject to SMA regulation could force the government to either purchase the land at fair market value or release them from the regulations).

[105] Assume for purposes of this simple example that the groups are disjoint. Also, my focus is only on the conflict over solar access, and not on any aesthetic objections that neighbors may have to solar collectors (or, for that matter, trees). In fact, aesthetic objections to solar power do sometimes lead to prohibitions. *See* Troy Rule, *Renewable Energy and the Neighbors*, UTAH L. REV. (forthcoming 2011) draft available at http://ssrn.com/abstract=1649090, at 19.

is aware of the Type to which any other household belongs, nor does the city of Hedgerow have this information. However, Hedgerow knows that Types 1H and 2H place a value of $5,000 on being able to carry out their plans, while Types 1L and 2L place a value of only $500 on the chance to pursue their rather inchoate intentions.

Hoping to minimize conflict, Hedgerow initially considers offering a deal to its residents whereby it agrees to buy any household's "build up" rights at a price of, say, $600. Note that transferring these "build up" rights equates to granting a negative easement for light and air (hereinafter, a "solar easement"). Alienating a solar easement imposes on the original owner the duty to keep the airspace clear, but it does not in any way compromise that original owner's ability to keep others from entering the airspace in question. By offering such a put option, Hedgerow can collect solar easements from the Type 1Ls and from all the Type 2s. It can then post a map that shows which households have surrendered these easements and offer them for sale to 2Hs, whose valuable plans depend on keeping the airspace clear. Such purchases may not always be possible (some 2Hs will be surrounded by 1Hs who will not have sold their options), but they may often be so. More important, 2H's who are considering locating in the neighborhood can examine the map to see which locations would enable them to acquire the easements necessary to carry out their desired plans.

A major drawback to this approach is that it is very expensive for Hedgerow to actually buy up all these solar easements and warehouse them until it can resell them (a time that might never arrive). Fortunately, as Hedgerow soon realizes, it does not actually have to buy the easements themselves in order to reduce future conflicts over solar power use; it can instead buy *options* to buy the easements. Just as financial futures and options show us that flexibility over time can be extended to third parties without actually alienating the underlying asset,[106] so too can control over land use rights be alienated separately from the underlying rights themselves.[107] All that is necessary to break up a later monopoly deadlock is a unilateral right to purchase. A call option grants the holder the right, but not the obligation, to acquire the underlying asset (here, the solar easement).

Thus Hedgerow can acquire call options on solar easements that it will hold for later resale by making a "flexibility payment" that represents only the option premium, not the value of the underlying easement itself.[108]

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[106] For an accessible introduction, see Lester G. Tesler, *Futures and Actual Markets: How They Are Related*, 59(2.2) J. BUS. S5 (1986).

[107] This line of analysis follows literature that casts property ownership as a set of "real options," including the option to continue possession and use, to develop, or to redevelop for another use. *See, e.g.*, Laura Quigg, *Optimal Land Development*, *in* REAL OPTIONS IN CAPITAL INVESTMENT: MODELS, STRATEGIES, AND APPLICATIONS 265 (Lenos Trigeorgis ed., 1995). Once these options are identified as separate repositories of value, the possibility emerges that control over them might be alienated to third parties.

[108] More precisely, Hedgerow would give residents a put option that would enable those residents to force a

Suppose a Type 1L landowner, Wunnell, takes Hedgerow's offer, and, in exchange for a small lump of cash, alienates a call option on her solar easement. All Wunnell has transferred is a call option granting the holder the right (but not the obligation) to engage in a later transaction to buy the easement at the going strike price (more on that shortly). Wunnell continues to hold "build-up" rights[109] until such time as someone—the city or a later buyer—exercises the call option and actually acquires the solar easement. However, any building-up that Wunnell does will be at her own risk (or pursuant to private insurance arrangements); if the call option is later exercised, Wunnell will be duty-bound to clear the solar path and keep it unobstructed. Alternatively, Wunnell can undo the deal by repurchasing the option before its exercise, subject to certain limits.[110]

Using the option format requires establishing not only an option price (the amount the government pays to acquire an option on Wunnell's solar easement) but also a strike price (the amount that a household purchasing a solar easement option would have to pay to acquire the easement itself). Pricing constitutes one of the most challenging aspects of this approach, and I will take it up in some detail in subpart B, below. For now, it is sufficient to suggest that some algorithm would be established for determining the "going rate" in a given area at regular intervals, and that this rate would determine the option's strike price.[111] A Type 2H owner (call him Tooaytch), would first acquire the solar easement option on Wunnell's property from the local government's option exchange. This would give Tooaytch the right, but not the obligation, to pay the current strike price (within some limited exercise period) and thereby acquire Wunnell's solar easement.[112]

Although there are a number of moving parts, the core idea is very simple: providing an institutional platform that allows households to voluntarily downgrade certain property entitlements (ones that they do not value very highly) from property rule protection to liability rule protection. In other words, owners are presented with the opportunity cost of holding veto power over entitlements, and thereby encouraged to delink the veto power for low-valued entitlements from the entitlements themselves. Figure 1 summarizes the structure of the situation as it unfolds over time for the various players, using the example outlined above.[113]

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sale of a call option on their solar easements. For discussion of pricing, *see infra* Part II.B.2.

[109] While Wunnell still owns the legal interest (even with a call option on it outstanding), it is technically not (yet) an easement. *See, e.g.*, Van Sandt v. Royster, 83 P.2d 698, 700 (Kansas 1938) (stating the rule that one cannot own an easement on one's own land).

[110] *See infra* Part II.B.3.

[111] *See* Kades, *supra* note 6, at 1255-56 (discussing "floating options").

[112] Option sales and resales would need to be limited in ways that would avoid creating new monopoly problems, whether through eligibility requirements that would constrain the pool of purchasers, or through alienability limits that would accomplish the same result indirectly. *See* text accompanying notes 156-158, *infra*.

[113] For completeness, I have included Types 2L and 1H in the chart, even though they are not directly

Figure 1:
Hedgerow's Option Exchange in Action (An Example)

Time / Player	Time 0	Time 1	Time 2
City of Hedgerow	Offers a deal (put option): We'll pay $$ for a call option on a solar easement across your land.	Sells call option acquired from 1L to 2H. The strike price is set at the then-going rate, and the exercise period is limited.	When 2H exercises the call option, serves as an intermediary in transferring the easement and forwarding payment.
Type 1H (High Valuer of Build-Up Rights)	Refuses deal; retains full property rule control[114] over rights to plant and build.	Plants trees to her heart's content.	Enjoys trees, avoids stressful interactions with solar-power enthusiasts.
Wunnell [Type 1L] (Low Valuer of Build-Up Rights)	Takes deal.	Plants or builds at her own risk (or pursuant to private insurance arrangements).	When call option for solar easement is exercised by 2H, receives the strike price and loses the easement.
Tooaytch [Type 2H] (High Valuer of Solar Access)	Takes deal.	Searches Hedgerow's solar easement call option exchange, locates a clear solar path across 1L's land, and buys the option.	Buys and exercises the solar easement call option Hedgerow acquired from 1L. Installs massive solar panels; enjoys solar power free of interference.
Type 2L (Low Valuer of Solar Access)	Takes deal.	Has no desire to build and is not currently motivated to seek a solar easement; just enjoys the extra cash.	Admires neighbor's solar panels. May become a 2H in time.

involved in the primary transaction examined in this example.

[114] This property rule control is not absolute, as property remains subject to the risk of later regulatory change, as well as to the possibility of eminent domain. *See* text accompanying notes 166-168.

3. Why Do It That Way?

This example, simplified as it is, might already seem unduly complex. Because any model of precaution must pay attention to administrative costs as well as accident costs and prevention costs, it is worth asking whether an option exchange's unfamiliar and somewhat elaborate structure adds anything useful to garden variety liability rules.[115] It might seem easier, for example, for Hedgerow to simply declare that no tall trees or buildings are allowed and let the serious tree lovers (Type 1Hs) buy their way out of that restriction.[116] As a response to a static situation in which the neighbors are already in place and their preferences are fixed, such a "pay to build" regime looks appealing. Recognizing the conflict as one that unfolds over time, however, shows how the option exchange arrangement just described might dominate.

Suppose that in 2000 nearly all households are would-be builders or tree-growers (Type 1s). However, most of them are Type 1Ls with only a vague sense that they might someday wish to use their airspace. Slapping a "no building up" rule on the population at this stage is hardly a politically popular move, nor does it seem particularly necessary. The "pay to build" provision, far from mitigating opposition to the rule change, would probably be viewed as yet another attempt on the part of local government to "mint" its own money.[117] Even putting political feasibility aside, however, consider how a "pay to build" scheme would operate over time as more solar-power enthusiasts (Type 2s) enter the population and preferences among both Type 1s and Type 2s grow more intense. Type 2s would immediately see that "pay to build" undermines their ability to move forward with their plans with any confidence. After Tooaytch makes a large investment in solar power, for example, a neighboring family might suddenly buy build-up rights.

There are a few ways to address this concern, but each introduces difficulties. One possibility is to channel the money collected from the "pay to build" buyout to any Type 2s whose plans are disrupted as a result. This will predictably cause Type 2s to pay little attention to avoiding conflict, and, indeed, some Type 2Ls might even find it profitable to court conflict in the hope of getting a payout in excess of their own valuations. The moral

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[115] *See* text accompanying note 23, *supra*.

[116] Alternatively, Hedgerow could start with a default rule of no right to solar access, but let solar enthusiasts (Type 2Hs) obtain easements and enjoin blockages thereof for a fee. *See* Rule, *supra* note 21, at 891-92 (describing Iowa's solar access regime, which adopts roughly this approach). This, too, would be a garden variety liability rule, although one corresponding to the rarer "Rule 4" subspecies in Calabresi and Melamed's framework. *See id.* at 860 fig. A, 891-92.

[117] Jerold S. Kayden, *Zoning for Dollars: New Rules For an Old Game? Comments On the Municipal Art Society and Nollan Cases*, 39 WASH. U. J. URB. & CONTEMP. L. 3, 3 (1991).

hazard problem could be limited by making compensation invariant to the Type 2s actual investments,[118] but an invariant payment gives Type 1Hs no incentive to identify themselves promptly, before costly investments are made.[119] Another possibility is to impose a sunset on the "pay to build" option, either by making it available only during a limited time frame or by cutting it off whenever a neighbor begins engaging in a conflicting use. But the former is ill-suited to changes over time that might cause new 1Hs to emerge, while the latter would encourage the kinds of wasteful communication discussed earlier, as owners race to truncate the rights of their neighbors.

Why does the option exchange described above perform better? Certainly we can say it would be more politically palatable simply because money is initially flowing in a different direction—towards those who voluntarily surrender their rights rather than away from those who want to retain their rights. But that is hardly a reasoned basis for preferring the put option structure; indeed, as we will see, the upfront cost involved presents an important obstacle to be overcome. The real advantage of the option exchange lies in its ability to distinguish between two sets of people who are observationally equivalent under the "pay to build" alternative: those who do not value the build-up right in excess of the price set for it, and those who do value the build-up right in excess of the fee but, for various reasons, prefer to wait before exercising it. Some of the tactics discussed above (sunsets, estoppel) do offer ways to shrink the second group, but at significant cost.

Now compare the option exchange. Here, Hedgerow starts by extending a put option: offering to buy up call options on solar easements. While it is true that we cannot tell whether those who have not yet exercised this initial put option will do so at some point in the future, this is less of a problem in terms of coordinating uses going forward. Recall, exercising the put option means relinquishing part of one's property package (the veto over alienation of build-up rights), not augmenting the package. Thus, while more people may exercise the put option in the future, that will only reduce the prospect of conflict, not heighten it. Those who have already exercised their put options have alienated along with it unlimited freedom to change their minds. Certainly we can structure the option exchange system to permit landowners who have alienated a call option on a solar easement across

[118] *Cf.* Cooter, *supra* note 4, at 14-15 (explaining how liquidated damages, which are invariant to actual harm, maintain incentives for the nonbreaching party in contract).

[119] The payment and compensation components could be decoupled, charging 1s based on actual costs to 2s, but giving 2s only the invariant lump. *Cf.* Plassmann & Tideman, *supra* note 31 (proposing a similarly decoupled approach – one in which the invariant lump is based on a self-assessed value – to align incentives in the eminent domain context). But if the objection to the option exchange arrangement is its complexity, this would not necessarily represent a simplification. It would also presumably be politically difficult to deny full compensation to harmed 2s when the government is collecting it from 1s.

their land to buy back that option before it is exercised by a third party.[120] But a third party contemplating buying an option would know that once she does so, she can complete a unilateral purchase of the underlying entitlement during the exercise period. This is different from the estoppel provision contemplated above in that the third party buying the entitlement (here, a Type 2 who wishes to engage in solar collection) need not engage in the use itself in order to extinguish the conflicting claim of the other party. Rather, she need only buy an option on the underlying entitlement, which has been voluntarily placed in a pool for purchase.[121]

There are other advantages to the specific option exchange format contemplated here[122] that might hold significance in specific contexts or under particular evaluative frameworks. By making the default rule one in which the landowner retains a given right, claims of involuntary confiscation of property, and associated intrusions on autonomy, are minimized. It is true that the system effectively imposes a fee on those who hold onto all their rights,[123] but this kind of interference with monetary value is typically viewed as standing on a different footing from a direct interference with the prerogatives of ownership.[124] The option exchange thus interjects flexibility into a property system without requiring more regulation while at the same time avoiding the political pushback that might accompany the explicit sale of zoning rights. A "pay to build" alternative

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[120] Part II.B.3, *infra*, discusses how buyback transactions might be handled, as well as limits that might be imposed to avoid strategic buybacks.

[121] Again, we could add features to the "pay to build" option that would cut off the chance to exercise the option upon sufficient payments from a third party interested in exercising inconsistent rights. But to create the structure for managing these payments would require an institutional platform no less complex than the option exchange itself.

[122] The discussion above presented only one of many possible ways of structuring an institutional platform for pairing buyers and sellers of options. Calabresi and Melamed's work and the large body of literature building on it emphasize that there is always a flip side of any arrangement, a Rule 4 for every Rule 2, a call for every put. *See, e.g.*, Calabresi & Melamed, *supra* note 3; Ayres, *supra* note 32; *see also* Saul Levmore, *Carrots and Torts*, in CHICAGO LECTURES IN LAW AND ECONOMICS 203 (Eric A. Posner ed., 2000). Options might also be nested, sequenced, decoupled, and combined in any number of ways. *See, e.g.*, sources cited in *supra* note 42. Although space does not permit cataloguing how all these alternatives might be incorporated into an option exchange format, one differently structured alternative is discussed below in Part II.C.2 (describing how parties might voluntarily alienate options of the "pay me to stand it" variety). Optioning one's power to engage in an affirmative use, as in the solar easement example presented here, produces a voluntary Rule 4 regime (in which a third party can pay to stop a use), while optioning the power to stop someone else's use creates a Rule 2 regime (in which a third party would pay to continue the use). *See* Calabresi & Melamed, *supra* note 3; Rule, *supra* note 21, at 891-92. I thank Ariel Porat for conversations on these points.

[123] Even though framed as a put option that pays a subsidy for relinquishing rights, the system amounts to a tax on those who fail to relinquish rights, assuming that the subsidies would be funded by property owners generally. For more on funding alternatives, see Part II.B.1, *infra*.

[124] Amnon Lehavi, *The Taking/Taxing Taxonomy*, 88 TEX. L. REV. 1235, 1238 (2010) (emphasizing the law's differential treatment of governmental acts that reduce value and those that interfere with exclusion or other core property rights); Richard A. Epstein, *The Seven Deadly Sins of Takings Law: The Dissents in* Lucas v. South Carolina Coastal Council, 26 LOY. L.A. L. REV. 955**,** 957-59 (1993) (criticizing this distinction in takings law); *see also* Armen A. Alchian, *Property Rights*, in THE NEW PALGRAVE DICTIONARY OF ECONOMICS (Steven N. Durlauf & Lawrence E. Blume, eds.) (2d. ed. 2008) online at http://www.dictionaryofeconomics.com/article?id=pde2008_P000226 ("It is important to note that it is the physical use and condition of a good that are protected from the action of others [by private property rights], not its exchange value.").

would combine these two elements by adding alienable regulations. As a result, it could be expected to elicit opposition both from property rights advocates and from those opposed to allowing people to buy their way out of land use restrictions.[125]

B. Money and Uncertainty

Despite its attractive features, an option exchange must confront a number of foundational problems involving the movement of cash among the players over time and under conditions of uncertainty. First, writing put options for the populace—even if what the governmental entity offers to buy is itself only an option—requires some source of funding. Second is the knotty issue of setting prices.[126] Third are a set of issues involving how, when, and at what price resales or reversals of the original transaction can be accomplished. Without purporting to provide a detailed operational blueprint, the sections below take up these questions.

1. Deposit-Refund Systems

The option premiums ("flexibility payments") offered to households who surrender veto power could be funded in a variety of ways, each with particular distributive and incentive effects. The challenge is to devise a funding approach that is consistent with the overall goal of minimizing total accident costs. Here it is helpful to revisit the idea that property ownership draws against a stock of spatial and temporal flexibility by granting owners a set of veto rights. Deposit-refund systems, of which bottle bills are a familiar example, suggest an interesting possibility:[127] owners might be charged a "flexibility tax" that could then be rebated in part as portions of the property bundle are optioned.[128]

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[125] *Cf.* Wallace E. Oates, *From Research to Policy: The Case of Environmental Economics*, 2000 U. ILL. L. REV. 135 (2000) (recounting how opposition to market-oriented pollution controls came both from those who believed entitlements to emit should not be sold and from those who resisted additional restrictions on their activities); Carol M. Rose, *From H_2O to CO_2: Lessons of Water Rights for Carbon Trading*, 50 ARIZ. L. REV. 91, 109-10 (2008) (observing that "the history of American water institutions suggests that cap-and-trade regimes are likely to be subject to moral objections from two almost diametrically opposed sources: a pro-development argument that any resource cap is immoral so long as there are still mouths to be fed; and a pro-environmental charge that it is immoral to trade away one's bad actions").

[126] This issue is not unique to the option exchange format, however; even a simple "pay to build" regime would require setting a price for exceeding the specified height.

[127] Independent work by Robert M. Solow and Edwin S. Mills laid the intellectual foundations for this approach. *See* Robert M. Solow, *The Economist's Approach to Pollution and Its Control,* 173 SCIENCE n.s. 498 (Aug. 6, 1971); EDWIN S. MILLS, URBAN ECONOMICS 259-60 (1972); *see also* PETER BOHM, DEPOSIT-REFUND SYSTEMS: THEORY AND APPLICATIONS TO ENVIRONMENTAL, CONSERVATION, AND CONSUMER POLICY (1981); Don Fullerton & Ann Wolverton, *Two Generalizations of A Deposit Refund System*, NBER Working Paper No. 7505 (2000), available at http://www.nber.org/papers/w7505.

[128] Although it takes a somewhat different tack, Nicolaus Tideman's work relates very closely to the issues I discuss here, both in terms of identifying and characterizing problems and in proposing mechanisms for addressing them. *See* Tideman, *supra* note 26, at 347 (noting imposition on flexibility that immobile

Spelling out the analogy to deposit-refund systems will help to illustrate some of the advantages of this approach. If it is costly to follow people around after they buy a bottled drink to determine whether they dispose of the bottle carefully or carelessly (and fine them in the latter case), an initial fee or tax equal to the damage that improper bottle disposal would inflict can be charged at the time of purchase.[129] This fee is paired with a later put option—the ability to force the sale of the empty bottle back to a designated facility at a fixed price. The surrendered bottle proves that one has not, in fact, inflicted the feared damage on society.[130] The net result of the combined deposit and refund is a tax on improper disposal.[131]

Economists have explored the use of "environmental bonds" or other generalizations of the deposit-refund idea to refine incentives over time and under conditions of uncertainty.[132] The idea is the same as in the bottle bill context: entities whose acts may inflict harms on society post bonds that will later be refundable in whole or in part upon a showing that the feared harm has not come to pass. Instead of presenting an empty bottle as proof that harm has not been inflicted, the entity might use other forms of proof to establish facts about the state of the world.[133] Although this way of approaching uncertain future impacts has been neglected in the legal literature, it could have significant traction in the land use setting.

Like bottles, landowners' entitlements can be disposed of in more or

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improvements present and recommending a tax system to address it); *id.* at 348 (exploring the possibility of using a land rent system to price both positive and negative spatial externalities); *id.* at 346 (suggesting a bond system to cover the costs of later abandonment); *id*. at 347 (explaining how "unsubdivided land" might be analogized to "an exhaustible natural resource such as oil"). In recent work, he and Florenz Plassmann have examined how a bond requirement could address uncertainty about the magnitude of externalities. *See* T. Nicolaus Tideman & Florenz Plassmann, *Pricing Externalities*, 26 EUR. J. POLIT. ECON. 176 (2010).

[129] *See* Robert Costanza & Charles Perrings, *A Flexible Assurance Bonding System for Improved Environmental Management*, 2 ECOLOGICAL ECON. 57, 59 (1990) .

[130] The system thus switches the burden of proof to the bottle purchaser. *See id.* at 59, 65.

[131] *See, e.g.*, Fullerton & Wolverton, *supra* note 127, at 2 ("This 'two-part instrument' is equivalent to a Pigovian tax on the 'dirty' activity"). This assumes that there are only two disposal choices, proper and improper. In fact, there are better and worse ways of disposing of bottles that are not turned in, and in some cases bottles that were not surrendered may have been put to another productive use (for example, as an input to a craft project). This overbreadth problem turns out to be less of a concern in the property context. Whereas in the bottle deposit context, the physical bottle merely proxies (imperfectly) for not having conducted an improper disposal, the surrendered flexibility in the land use context is valuable in itself, and costly (though often cost-justified) when retained.

[132] *See, e.g.*, Costanza & Perrings, *supra* note 129; Charles Perrings, *Environmental Bonds and Environmental Research in Innovative Activities*, 1 ECOLOGICAL ECON. 95 (1989); Ronnie Horesh, *Better than Kyoto: Climate Stability Bonds*, 22(3) ECON. AFFAIRS 48 (2002). For a recent overview of the literature and some variations on the deposit-refund theme, see Angelo Antoci, *Environmental Options and Technological Innovation: An Evolutionary Game Model*, FEEM Working Paper No. 90.2009 (November 2009) available at http://ssrn.com/abstract=1515701. For a discussion of some difficulties with this approach, see *Loredana Torsello & Alessandro Vercilli, Environmental Bonds: A Critical Assessment* in SUSTAINABILITY: DYNAMICS AND UNCERTAINTY (Graciela Chichilnisky et al., eds, 1998).

[133] *See, e.g.*, Costanza & Perrings, *supra* note 129, at 65-66. The same idea can be applied to encourage social improvements; bonds can be issued that will pay off when particular social goals are met or particular, measurable conditions obtain (ones that the bondholders have some capacity to influence). Ronnie Horesh, *Injecting Incentives Into the Solution of Social Problems: Social Policy Bonds* 20(3) ECON. AFFAIRS (2000) It is even possible to issue bonds that give two different groups or entities different sides of the same bet regarding the future state of the world. *See* Antoci, *supra* note 132.

less costly ways. For example, they can be used as a source of monopoly leverage or they can be surrendered to a higher valuing user in a low-cost bargain. Examining the situation ex post, we cannot tell whether a particular landowner who refuses to sell some element of her holding is exercising a blocking power over a low-valued right, or is using her veto power as owner to retain a high-valued right.[134] Providing a mechanism for advance surrender of the blocking power can help to differentiate between high- and low-valuing owners. Low-valuing owners would still be free to hold onto their veto rights in the hope of later using them strategically, but this tendency would be cabined in two ways. First, they would forgo a payment in doing so, which raises the opportunity cost of making that choice. Second, the expected return from strategic behavior would be likely to drop once it becomes easier for parties to make location decisions that take into account the amenability of the neighbors to their planned uses.

To be clear, I am not suggesting that there is anything morally blameworthy or suspect about an owner wanting to retain veto rights over portions of her property package for which she has no current or pending plans. My point is only that this retention of rights (like every other instance of ownership) amounts to a sustained draw against a limited stock of flexibility, and should be priced as such. The deposit-refund notion is helpful in that it can deal relatively well with externalities whose magnitudes are unknown. We can be sure that, in the aggregate, large quantities of privately held property rights have an inertial effect, but we cannot know exactly how or when particular plans will be thwarted. Taking an advance payment[135] that acknowledges the potential of ownership's prerogatives to ossify the built environment provides a mechanism for selectively providing incentives for flexibility from that same fund as the need arises. This approach may strike some readers as insufficiently protective of property rights. In fact, it is likely to be far more protective of private property rights if it succeeds in allowing purchased private flexibility, surrendered voluntarily, to substitute for across-the-board transfers of rights from private parties to collectives.

2. Valuation and Pricing

A full analysis of how land use options might be structured and priced is beyond the scope of this essay, but a few observations on valuation and pricing are in order. As a threshold matter, it is important to keep straight

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[134] In other words, we cannot tell whether someone is acting as a (strategic) holdout or an (honest) "holdin." *See* Gideon Parchomovsky & Peter Siegelman, *Selling Mayberry: Communities and Individuals in Law and Economics*, 92 CAL. L. REV. 75, 128–29 (2004).

[135] Given that the externality in this case flows from continuing to hold an owner's veto, payment would be assessed annually or at other regular intervals. *See infra* note 143 and accompanying text.

several different moving parts: (a) an initial tax or deposit collected from property owners that reflects the potential interference with future flexibility of their veto rights; (b) a flexibility premium offered to landowners for the sale of call options on certain entitlements (technically, the strike price on a put option written by the governmental entity); (c) the price at which other landowners can acquire those call options (the option price for the call option); and (d) the price at which those other landowners can exercise the option to actually acquire the entitlement (the strike price for the call option).

The last element, the strike price at which the entitlement is actually transferred, offers a natural starting point for analysis. Even if particular land use entitlements are not frequently bought and sold on the open market, it may be possible to develop a measure for valuing these elements using a hedonic pricing method.[136] In particular contexts, other possibilities may exist as well. For example, solar energy produces energy savings that are quantifiable, making it possible to tie the strike price for exercising a solar easement option to, say, the average energy cost savings achieved by all landowners within a given category (such as residential single-family households on lots less than one acre).[137] This figure would change over time but could be determined at any given time using an agreed-upon index. The original owner in the story would, after selling this option, hold an entitlement subject to an index-priced option or "ESIPO."[138]

Keying the price to an element relevant to the *purchaser's* valuation might seem exactly backwards, since it would mean that transactions could occur more easily when the easement becomes less valuable in the purchaser's hands. But if a fixed lower bound for the strike price were set using this same method at the time the option were initially conveyed, we could be certain that options would only be "in the money" when the value to the purchaser exceeded the price that the seller initially found sufficient. Allowing the exercise price to then float upward when (but only when) it starts to become more valuable to others would help to overcome what is likely to be the largest resistance point to transferring the option: the opportunity cost of giving up the chance to later bargain over a larger surplus.[139]

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[136] For discussion of the hedonic market analysis, see, for example, JONATHAN GRUBER, PUBLIC FINANCE AND PUBLIC POLICY 202 (2005). *See also* Jonathan Remy Nash, *Mark to Ecosystem Service Market: Repricing Conservation Easements to Protect Ecosystems*, *in* REBUILDING THE ARK: NEW PERSPECTIVES ON ESA REFORM (Jonathan H. Adler ed., forthcoming 2011) (discussing alternative valuation methods for conservation easements).

[137] It would also be necessary to select a time horizon over which the energy savings should be calculated, as well as decide whether special financing should be made available to purchasers to address liquidity issues.

[138] *Cf.* Carol M. Rose, *The Shadow of* The Cathedral, 106 YALE L.J. 2175, 2179 (1997) (observing that a liability rule creates a "property right subject to an option (or easement)" — that is, a "PRSTO (or PRSTE)").

[139] This analysis does not turn on whether the valuation of the original owner is actually correlated with that of the easement acquirer, nor on how or whether correlated values relate to the choice between property rules and liability rules. For discussion of those issues, see generally Ian Ayres & Paul Goldbart, *Correlated Values in the*

ESIPOs are not the only pricing alternative available, however. Another approach would allow the original owners to set the prices at which options could later be exercised—what I have elsewhere termed entitlements subject to self-made options, or "ESSMOs."[140] ESSMOs offer a great deal of flexibility where valuations vary widely and contain significant subjective components. Administering them adds a few additional wrinkles, however—notably the need to adjust the price of the option itself to reflect the selected strike price. For example, the government would not want to pay the same flexibility premium to a household that set a price for its solar easement at $1 million as it would to a household that set a price of $100. One possibility would be a sliding scale or menu of strike prices for the call option (element (d) above) integrated with a corresponding list of flexibility premiums (element (b)).

Consider next factor (a), the initial tax or fee on ownership's inflexibility. One benchmark might be the "settlement costs" of condemnation,[141] plus the expected costs of preparing the property for a new use: the costs of paying compensation for, and then tearing down and hauling away, any improvements added to the land that cannot be repurposed.[142] Suitable adjustments could then be made for factors that increase the likely need for condemnation, such as especially strategic placement, excessively small lot sizes (making reassembly more difficult), and so on.[143] While an owner's inflexibility may lead to many outcomes other than condemnation, including additional land use regulation that does not require payment of just compensation, condemnation remains an available last resort that helps to set the outer bounds of the potential interference that ownership of the entire property block produces. The point of the fee is not, of course, to pre-fund the expanded use of eminent domain, but rather to collect for an externality produced by ownership and, by pricing it, reduce the tendency to hang onto the sorts of unnecessary rights that make eminent domain (and other coercive interventions) more likely.

Theory of Property and Liability Rules 32 J. LEGAL STUD. 121 (2003) and Kaplow & Shavell, *supra* note 43. Rather, the approach here is driven by the owner's opportunity costs of transforming a property rule entitlement into an entitlement protected only by a liability rule, where part of the package that attends the former is the ability to try to capture a share of any later bargaining surplus.

[140] *See* Lee Anne Fennell, *Revealing Options*, 118 HARV. L. REV. 1399, 1433-44 (2005) (describing ESSMOs and reviewing antecedent literature taking similar approaches).

[141] *See* Michelman, *supra* note 39, at 1214-15 (defining "settlement costs" as the "dollar value of the time, effort, and resources which would be required in order to reach compensation settlements adequate to avoid demoralization costs"). The actual fair market value of the property that would be obtained or transferred through eminent domain is not part of these settlement costs.

[142] On the advance payment of a destruction fee, see Tideman, *supra* note 26, at 346. The destruction fee also relates to the abandonment point raised *infra*, Part II.C.3.

[143] *Cf.* Tideman, *supra* note 26, at 347 (proposing an annual tax based on the self-assessed value of improvements to account for the social loss of flexibility associated with remaining on a given site). Tideman contemplates that such a tax would work in conjunction with a system in which owners pay the rental value of the land to the government. *See id.* at 342-47.

The deposit-refund literature suggests choosing a high estimate of likely future damage (here, from inflexibility) where significant uncertainty exists. If later information reveals that the initial estimate of damage is too high, rebates can be made across the board to property owners.[144] In this context, such a readjustment might be triggered by changes in demand for urban and suburban land within a given jurisdiction due to exogenous changes in the costs or benefits of physical agglomeration, or by other technological changes (such as virtual reality advances) that make the acts of neighbors less consequential or the need for redevelopment less pressing. Even in the absence of governmental adjustments of initial estimates, insurance companies could step in with actuarially determined estimates, paying the flexibility tax on behalf of their customers in exchange for a premium and the assignment of all later rebates.[145]

Finally, it is necessary to consider the pricing of the option on, say, the solar easement—both when it is initially transferred to the government's option exchange, and when it is later transferred to a third party (such as a neighbor).[146] The amount the government offers to households that sell a call option on an entitlement with strike price (d) amounts to a partial rebate on (a) that, like a bottle deposit refund, is based on the owner's softening of inflexibility. As such, it should be selectively priced based on the harm that a given type of inflexibility is causing. The government then acts as a broker or middleman in reselling the call option to other households at price (c), which would reflect an administrative increment as well as the constrained length of the option period that is extended to third parties.[147]

Lurking in the background of all this pricing is the fact that the adjustments being made through options might also be made, at least in many cases, through regulatory action without any compensation at all. This presents some complications, but it also helps to provide a relevant baseline for evaluating how even very imperfectly priced options might perform. However rough and approximate the pricing might be, any separation that options achieve between high and low valuing entitlement holders will improve precision over an across-the-board regulatory approach.

3. Reacquisitions and Resales

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[144] *See, e.g.*, Costanza & Perrings, *supra* note 129, at 66.

[145] *See* BOHM, *supra* note 127, at 86-89.

[146] There could be non-neighbor third party intermediaries who purchase and resell options, although these sales would have to be subject to limits on resale that are consistent with the goals of the option exchange. For example, it would do no good to have individual owners surrender their monopoly power only to allow a private entity to monopolize an entire community's set of options for a given use.

[147] The option could be unlimited in term while yet held by the government, but the option period should be strictly limited upon its transfer to a third party. *See* text accompanying note 150, *infra*.

Using options to extend flexibility to others necessarily means restricting one's own flexibility. I have emphasized throughout that the future is fraught with uncertainty and that new information unfolds over time. This is true at the individual owner and parcel level, as well as at a larger scale. How, when, and at what price should an owner who previously optioned or alienated entitlements, or a new owner of a parcel on which entitlements have been optioned or alienated, be able to reclaim control over that entitlement?[148] As Figure 1 suggests, there are at least three relevant points in the timeline. First, there is the initial transfer of a call option to the local governmental entity, which we can designate as having occurred at Time 0. Then, at Time 1, the call option is resold to another party. Finally, at Time 2, the option is exercised by the other party.

Between Time 0 and Time 1, it would be feasible to allow owners to buy back their options by repaying the initial flexibility payment along with an additional increment to cover administrative costs. But it would be advisable to add restrictions to ensure that this buyback alternative is not elected strategically (that is, as soon as the original owner gets wind that someone may be interested in using the entitlement). One approach would be to make any entitlement for which an option is reacquired inalienable for a certain period, or alienable only by re-exercising a put option to return it to the government's option exchange at the price at which it was originally surrendered.[149]

Between Time 1 and Time 2, the limited option exercise period established by the government when the option is transferred to a third party, the original owner would be unable to call back the option except by negotiating a deal with the option holder. Keeping the exercise period of the option relatively short once it is in the third party's hands reduces the chance that the option holder will become the lower-valuing user of the underlying entitlement in the interim. If that were to happen, the original owner could still attempt to buy back the option from the option holder before it is exercised,[150] but the option holder could refuse to sell in an effort to extract more surplus from the original owner.[151] In other words, the call option would itself be protected by a property rule, and as such

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[148] The possibility of multiple rounds of liability rule takings has been viewed as a conceptual difficulty with the liability rule or call option approach, although one that can be addressed through various mechanisms. *See* Rose, *supra* note 138, at 2189 (citing and discussing Kaplow & Shavell, *supra* note 43); Ian Ayres & J.M. Balkin, *Legal Entitlements as Auctions: Property Rules, Liability Rules, and Beyond*, 106 YALE L.J. 703 (1996)).

[149] The possibility of using alienability restrictions to avoid strategic behavior is discussed in, e.g., Abraham Bell & Gideon Parchomovsky, *Taking Compensation Private*, 59 STAN. L. REV. 871 (2007); Ian Ayres & Kristin Madison, *Threatening Inefficient Performance of Injunctions and Contracts*, 148 U. PA. L. REV. 45 (1999); Fennell, *supra* note 51.

[150] *See* Ayres & Talley, *supra* note 43, at 1042.

[151] *See id*. at 1043-44 (noting the possibility that option holders could misrepresent their valuations). Conversely, if the option holder learns that the original owner now values the entitlement far *below* the strike price, she might threaten not to exercise the option unless the original owner makes a supplemental payment that effectively drops the strike price. *See id*.

would grant its holder a veto power. There is no guarantee that these bargaining sessions would end efficiently, but they might still feature lower transaction costs than the status quo.[152]

After Time 2, the party exercising the option now owns the entitlement in question, such as the solar easement in our example. It remains to be seen, however, whether that entitlement will, over the long run, end up being more complementary to the new holder's property package, the original owner's property package, or the property package of some new and as yet unidentified claimant. Clearly, the option exchange should remain open and available to the optioning of "secondhand" entitlements. For example, suppose Tooaytch in the story above decides to move away, and the new owners of their parcel have no interest in solar power and no need for the solar easement. A simple "flexibility payment," similar to the one originally offered to Wunnell, could encourage these new owners to restore an option on the entitlement to the option exchange. This would help to ensure that the easement is eventually reunited with the original parcel if that is the efficient outcome, or transferred to yet another party if that becomes the efficient result.

More than this might also be done, however, if we fear that the rigidity of veto rights (this time held by the entitlement's new owner) will cause entitlement patterns to become stuck in an inefficient equilibrium. If one believes that the block that makes up a traditional property holding tends to be made up of highly complementary elements and that long-term complements deviating from that pattern are rare,[153] then there could be reacquisition protocols that grant special rights of first refusal to original owners, that guarantee that later sales to them will be at a certain capped rate, or that otherwise limit alienability in an effort to prevent holdups.[154]

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[152] For example, the option exchange platform may let the parties find out about their mutual interest in the entitlement before any costs have been incurred in reliance, and could ease the logistics of interacting. Ayres and Talley have also argued that bargaining may be easier in the shadow of a liability rule (here, the call option) than in the shadow of a property rule, because information about the original owner's valuation will be embedded the type of transaction she proposes (that is, whether she offers the option holder a payment not to exercise the option, or a payment to exercise it). *See id*. at 1036-47. This point has been disputed, however. *See* Louis Kaplow & Steven Shavell, *Do Liability Rules Facilitate Bargaining? A Reply to Ayres and Talley*, 105 YALE L.J. 221 (1995); *see also* Ian Ayres and Eric Talley, *Distinguishing Between Consensual and Nonconsensual Advantages of Liability Rules*, 105 YALE L.J. 235 (1995) (responding to Kaplow and Shavell's critique). In any event, a short exercise period that limits opportunities for large valuation swings should help to reduce the risks of bargaining failure in the option's post-acquisition, pre-exercise period. I thank Ed Iacobucci for prompting me to consider these issues.

[153] *See, e.g.*, Henry E. Smith, *Modularity in Contracts: Boilerplate and Information Flow*, 104 MICH. L. REV. 1175, 1185, 1196 (2006) (discussing how the right to exclude may make specification of complements unnecessary in property, and noting the possibility that complementarity "sometimes track[s] prelegal natural boundaries").

[154] *See supra* note 149. Such an approach would ensure that the option exchange would not introduce an "anticommons" tragedy. For background on the anticommons problem, see generally Michael Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998). The core strategic dilemma associated with the anticommons is the holdout problem generated by the separate ownership of complementary fragments. *See generally* Lee Anne Fennell, *Common Interest Tragedies*, 98 NW. U. L. REV. 907 (2004); *see also* James M. Buchanan & Yong J. Yoon, *Symmetric Tragedies: Commons and Anticommons*, 43 J.L.

Sunsets on the transferred entitlements, after which ownership would automatically revert to the original owner, would be another possibility.[155] It is possible, however, that the spatial box will become an increasingly obsolete proxy for complementary entitlements. In that case, we might refrain from granting special rights to the original entitlement holder but look for ways to more broadly add flexibility enhancers, like special auction-like protocols for further alienability.

I have focused so far on using options to accomplish transfers to parties who intend to use the subject entitlements themselves. But unless some limits were placed on the resale of options (and the underlying entitlements), the monopoly power of individual property owners might be replaced by the monopoly power of a party who aggressively buys up control of many entitlements of a certain type.[156] To forestall this result, the option exchange might directly police who can buy options; for example, it might require that the acquisition of the underlying entitlement plausibly enhance the would-be buyer's own property.[157] Another alternative would be to limit alienability, as through holding periods or resale protocols, in an effort to select for purchasers interested in personally using the entitlement.[158]

The idea of adding alienability restrictions to constrain strategic behavior following an entitlement's initial optioning raises the question of whether directly applying such measures to all entitlements at present would be a better way to enhance flexibility. I think the answer is a qualified no, because we do not yet have good information about the kinds of entitlements for which such flexibility will ultimately prove most valuable. Selective use of put options as that information begins to emerge can offer a lower-impact way to begin a transition from an unduly blocky conception of ownership. But it is possible that an option exchange could be a transitional institution, and that in the longer run entitlements embedded with certain kinds of flexibility preservatives could, much like shatterproof glass, become the new standard.

& ECON. 1, 5 n.5 (2000). The option exchange approach addresses this core problem by allowing entitlements that are in fact complementary (whether or not they are contained within the same spatial blocks) to be united more easily, through a voluntary rather than coercive process. Adding limitations going forward could ensure similarly easy reunification with the initial owner's block (or with any other holding to which the interest is complementary).

[155] *See* Rule, *supra* note 21, at 892-93 (recommending that solar easements be limited in duration).

[156] *Cf.* Banner, *supra* note 73, at 35 (describing the plot of Herbert Quick's 1909 novel, *Virginia of the Airlanes*, in which "a mysterious enterprise called the Universal Nitrates and Air Products Company is found to have been quietly purchasing the air above farms, streets, and waterways all over the world, creating a plaid pattern made up of long strips of air ownership").

[157] In other words, the option exchange might contemplate only transfers of easements appurtenant, which would typically run with land. *See, e.g.*, DUKEMINIER ET AL., PROPERTY 767-68 (7th ed. 2010).

[158] *See, e.g.*, Fennell, *supra* note 51, at 1440; Rose-Ackerman, *supra* note 51, at 953-54.

C. Extensions

While the solar versus sequoias example is not trivial, it is meant to illustrate a much broader set of possibilities for addressing unpriced draws against future flexibility. Consider a few ways that the notion of precautionary entitlement concessions could be extended.

1. WYSIWYG-ing Land Use

One way to think about the communication deficit flagged above[159] is as a failure of the "what you see is what you get" ("WYSIWYG") [160] principle that pervasively guides our physical interactions. As we move about in the world, whether on foot or in a vehicle, our ability to avoid collisions depends crucially on getting accurate real-time information about the position of others relative to our own. A large fraction of ordinary (and usually unremarked) precautions are dependent on direct observation, which conveys information not only about where others are at a given point in time, but also about which direction they are moving, and at what speed. So important is our reliance on WYSIWYG assumptions, in fact, that departures are usually flagged with warnings (e.g., "objects in the mirror are closer than they appear" or "hidden driveway"). In the land use arena, there is considerably less transparency, making it harder for land users to predict how best to avoid a conflict. Zoning advances predictability,[161] but it comes with some well-known costs. Optioning specific entitlements like solar or view easements could surgically forestall known sources of conflict, as already discussed. A more ambitious approach would involve transforming property holdings from opaque "black boxes"[162] to WYSIWYG-compliant entitlement packages.

How might this be accomplished? Suppose that a local governmental entity, instead of buying options on specific entitlements like solar easements, instead offered landowners payments for a bundle of options that collectively covered the inverse of all existing and planned uses—the empty space filling the owner's block of property after her own current and expected uses are spoken for. In effect, the owner would have the opportunity to place virtual shrinkwrap around both existing and planned

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[159] *See supra* Part I.B.3.

[160] Back in the early days of the personal computer, the acronym WYSIWYG ("what you see is what you get") defined an aspirational ideal—software that could display on the screen something that resembled the look of the printed document.

[161] *See, e.g.*, White & Wittman, *supra* note 92, at 266 ("Spatial zoning has the advantage over prospective liability rules in that it shifts the burden of forecasting future land-use patterns from individual land users (and the courts retrospectively) to a planning authority. It thus reduces uncertainty.").

[162] *See* Henry E. Smith, *Mind the Gap: The Indirect Relation Between Ends and Means in American Property Law*, 94 CORNELL L. REV. 959, 969 (2010); *see also* text accompanying notes 220-225, *infra*.

uses (with no distinction between the two) and option the balance. Under this inverse shrinkwrap or WYSIWYG approach, participating landowners might use a computer-assisted drawing program to define the spatial parameters they plan to permanently physically occupy[163] and to indicate, using specified categories,[164] the sets of uses they contemplate for those spaces.

Significantly, this approach would not involve owners selling off everything in a given parcel's three-dimensional box that lies outside of the owner's current actual use, or even outside of her currently planned uses. It would not even mean selling off an easement with respect to those spaces and uses. Rather, it would mean softening the edges of the property holding with respect to those spaces and uses by allowing neighboring owners to unilaterally acquire negative easements. These other owners would be able acquire and exercise call options from the option exchange in which the WYSIWYG options have been deposited, thereby privately placing restrictions, at a price, on new uses and expansions that would interfere with the neighboring owner's own uses.[165]

Here it becomes important to note the degree to which this approach tracks and diverges from existing arrangements. Governmental bodies already hold what amount to free options[166] to add a fairly wide range of restrictions to the spaces and uses that owners have left fallow.[167] At most, the government would be required to pay fair market value to restrict or acquire uses or spaces.[168] But the government's use of such regulatory options effects an involuntary transfer of land use entitlements, which might be opposed on grounds of both efficiency and fairness in particular instances. The resulting land use controls are also lumpy in nature; the switch is typically thrown for all parcels in a given zone or area, or not at all. As such, the tool may be too blunt to achieve the right level of precaution in contexts where small adjustments among neighbors are sufficient. Allowing owners to voluntarily make options available as to unused entitlement space thus offers a distinctive alternative that might advance owner autonomy by reducing some of the pressures toward overbroad land use regulation.

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[163] As already suggested, many landowners use significant proportions of their land and airspace in a passive manner as a buffer or source of light and air, or for transient uses like kite-flying or frisbee tossing.

[164] For example, the categories used for zoning classifications might be used.

[165] Some limits would be necessary to avoid certain kinds of problems, like anticompetitive or spiteful option exercises.

[166] The option is free in the sense of not requiring a monetary payment. There is a political price, although it may be negative in a given instance.

[167] *See, e.g.*, Penn Central Transportation Co. v. City of New York, 438 U.S. 104 (1978).

[168] If a governmental restriction were held to amount to a regulatory taking, just compensation in the form of fair market value would be required by the Takings Clause. *See, e.g.*, Coniston Corp. v. Village of Hoffman Estates, 844 F.2d 461, 464 (7th Cir. 1988) (explaining that "'just compensation' has been held to be satisfied by payment of market value").

2. Pay Me To Stand It

Thus far, my examples have focused on cases where the precaution that keeps a given conflict from arising involves owners curtailing their own affirmative uses (that is, refraining from growing tall trees or building view-blocking additions). The WYSIWYG approach in the previous section is merely a generalization of that idea, again focusing on how ceding rights to certain externality-producing uses can reduce conflict. But curtailing uses that can cause offense is only one side of the interaction; there is also the question of one's willingness to withstand the potentially offensive use. Certainly, we might expect the most sensitive individuals to locate in places where they can acquire more rights to control what their neighbors do. Thus, the households that are most bent on solar energy would locate in places where they can acquire their neighbors' solar easements, the households that are most sensitive to changes in views would locate in places where they can acquire view easements, and laundries would locate next to businesses that are willing to alienate any right to emit. Over time, this would tend to place those who are relatively less sensitive next to landowners who have not chosen to option control over their prospective uses. But sorting could take place on a more fine-grained basis if we could work from the "most insensitive" side of the spectrum as well, easing transactions between those who cause impacts and those best positioned to endure them.[169]

How might this work? Limited instances already exist where those causing spillovers have offered payments to neighboring landowners in exchange for their acceptance of impacts.[170] While it is easiest to imagine owners being willing to sell exposure to discrete impacts like wind turbine noise, tolerated impacts might also be framed in broader terms, such as certain decibel limits.[171] Or some owners might offer options that would expose them to certain classes of impacts (barking dogs, say) only on condition that the same impacts be tolerated by the purchaser.[172]

To be sure, these sorts of options raise a bevy of concerns that are not

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[169] Of course, sorting can also occur in response to actual or planned uses, with land prices playing a mediating role. *See* Vicki Been, *What's Fairness Got to Do With It? Environmental Justice and the Siting of Locally Undesirable Land Uses*, 78 CORNELL L. REV. 1001, 1016-18 (1993). The difference here is that option sales could send signals that precede, and hence influence, actual land use choices, while also providing compensation to those who make themselves vulnerable to impacts. Auction processes for making siting decisions offer a similar approach, albeit one that is typically envisioned as engaging collectives rather than individual households. For discussion and critique of such siting proposals, see, for example, Been, *supra*, at 1052-55.

[170] *See, e.g.*, William Yardley, *Turbines Too Loud? Here, Take $5,000*, N.Y. Times, July 31, 2010 (reporting on energy company's payments of $5,000 to residents who signed a waiver agreeing not to complain about the noise of wind turbines).

[171] This would amount to the flip side of performance zoning, a kind of performance "unzoning."

[172] This is a rough analogue of the "share alike" feature in Creative Commons.

implicated, or at least not implicated as strongly, by agreements to yield incompatible active uses of one's own (like building sun-blocking structures) to facilitate passive uses (like solar collection). Here, the situation is reversed: one agrees to yield one's own passive uses (such as enjoying peace and quiet) to the incompatible, active uses of others. For one thing, being the first to announce a willingness to accept certain kinds of impacts could draw a disproportionate number of such impacts to one's doorstep.[173] This makes it less clear precisely what one is giving up. A similar result follows if information asymmetries exist or people are just not very good at predicting how certain kinds of impacts will affect their own preferred uses. The fact that people with more limited resources would be more likely to trade off quality of life for cash raises the same sorts of fairness concerns that we have seen in many other contexts, including those involving siting decisions.[174] Finally, the underlying interest being optioned in this context does not correspond to a garden variety easement, but rather to an agreement not to complain about impacts. While similar servitude-like permanent damages have been awarded by courts,[175] a market transaction that renders one's property permanently vulnerable to future impacts may differ in relevant respects from a remedial choice that is implemented after the impact is in evidence.[176]

3. Putting Up With Abandonment

Another potential source of inefficiency in land transactions involves property that no longer produces positive value for its owner. Interestingly, the common law does not allow owners to abandon fee interests in land.[177] Assuming that another owner could put the property to better use, this nonwaivable indefinite continuation of ownership presents obvious inefficiencies. Often this suboptimal ownership is ultimately resolved through forfeiture (whether due to unpaid property taxes or an unpaid mortgage), but those processes have their own shortcomings. Not only may they be protracted, the parties to whom the fee interest would be forfeited may have little interest in claiming it.[178]

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[173] *Cf.* Lee Anne Fennell, *Contracting Communities*, 2004 U. Ill. L. Rev. 829, 866 (noting how an adverse selection dynamic might impede certain moves toward less restrictive private community rules).

[174] *See, e.g.*, Been, *supra* note 169, at 1016-18 (discussing the possibility that siting decisions induce moves that result in the clustering of lower-income populations near the locally undesirable land use).

[175] *See* Boomer v. Atlantic Cement, 257 N.E.2d 870, 875 (1970).

[176] The concern might go back to information asymmetries or uncertainty over the ultimate extent of the impacts. I thank Eduardo Peñalver for discussions on this point and on the related issues raised in this paragraph.

[177] *See* Lior Jacob Strahilevitz, *The Right to Abandon*, 158 U. PA. L. REV. 355, 359–60, 399–402 (2010).

[178] *See, e.g.*, Susan Saulny, *Banks Starting to Walk Away on Foreclosures*, N.Y. TIMES, Mar. 30, 2009, available at http://www.nytimes.com/2009/03/30/us/30walkaway.html. One solution is to legally require the lienholder to take title. *See* Strahilevitz, *supra* note 177, at 388.

There are other escape hatches as well—notably adverse possession and eminent domain. Yet each of these involuntary transfer mechanisms comes with significant costs that can be traced to uncertainty about whether the existing owner is really a low-valuer. This uncertainty creates a risk of undercompensation and, in the case of would-be adverse possessors, a risk of lost investment efforts.[179] Yet the law provides low-valuing owners with no incentive to identify themselves and turn over their property voluntarily; indeed, it denies them even the simple expedient of formally renouncing their ownership and returning their property to the common pool. Even (or perhaps especially) if we think that abandonment generates externalities that make policymakers reluctant to encourage it,[180] a deposit-refund system could be usefully employed that involves paying for potential disposal costs upfront.[181] Granting owners who later voluntarily relinquish ownership to a common bank a refund of part or all of an initial charge for disposal costs would remove the delay and guesswork that now accompanies transfers from very low-valuing owners to higher-valuing ones.

4. The Problem of Assembly: Lessons from Groupon

Consistent with the road accident analogy, the analysis thus far has taken place at an extreme micro level, examining conflicts between two neighbors. This simplification has been helpful in illustrating how entitlements might be voluntarily adjusted to avoid conflicts, but it has done little to suggest how land use rigidities might be loosened on a broader scale. To be sure, some unfreezing or unsticking would be expected if more fine-grained land use transactions make unnecessary broader-based, inertia-producing land use controls like zoning and community-wide covenant schemes. But because many efficient land use transitions depend on groups of nearby landowners agreeing on something (or having their objections overridden), the concept of precautionary land use entitlements will be most useful if it can harness coordination on a broader scale.

A number of scholars have devised elaborate mechanisms for aggregating landowner consent through modifications to (or substitutes for) the eminent domain process.[182] My goal here is neither to recount those

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[179] *See* Strahilevitz, *supra* note 177at 416-17.

[180] *See id.* at 400-01.

[181] *See* Tideman, *supra* note 26, at 347 (suggesting that "any person who transformed a site in a way that made it expensive to restore that site to a condition of "bare land" could be required to post an interest-bearing bond that would run with the land, against the contingency that his site would be abandoned and require restoration"). Lior Strahilevitz makes a related suggestion: requiring abandoning owners to clearly mark off the property and publicize their intentions, with the possibility of favorable tax treatment (or avoiding a fine or penalty). Strahilevitz, *supra* note 177, at 408-09. Collecting the disposal fee in advance makes it easier to offer an attractive carrot for complying with such rules of proper disposition, and avoids the problem of trying to extract penalties from someone who is missing or insolvent.

[182] *E.g.*, Michael A. Heller & Rick Hills, *Land Assembly Districts*, 151 HARV. L. REV. 1465 (2008); Amnon

contributions nor to formulate a new, full-blown replacement for eminent domain. Instead, I want to briefly suggest how the option exchange ideas developed here could be extended to aggregation problems, whether involving entire fee interests or smaller entitlements, through the use of mechanisms for collecting conditional or contingent consent.[183] Contingent consent, as I use the term,[184] simply means agreement that is binding only if enough relevantly situated others also agree. A current example is found in Groupon's business model.[185] On a daily basis, discount offers from local providers of goods and services, such as restaurants, theaters, and spas, are widely disseminated to subscribers, who can opt to accept the deal during a limited time (a day or so) or let it pass by. In each case, the provider will have specified a minimum number of acceptances necessary to make the deal "tip." If not enough takers are found, the deal is off and none of the takers receives, or is bound by, the deal.[186]

Although Groupon is fairly new, the idea it embodies is not. It has long been recognized that a system that makes one party's contribution to a particular good contingent on the contributions of enough others can play a crucial role in collective funding settings.[187] The technique is especially useful where "step goods" are involved—goods like bridges that are of little value until a certain increment (enough to span the chasm) is provided.[188] Land use entitlements are often similarly "lumpy" in that they are much more valuable when aggregated. Unlike the funding mechanism for a bridge, however, the aggregation necessary in the land use context tends to be spatially sensitive. Thus, if one wishes to run a very noisy machine that will bother one's ten closest neighbors, it is not enough to aggregate "noisy machine consent" from ten random households in one's town; rather, you

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Lehavi & Amir N. Licht, *Eminent Domain, Inc.*, 107 COLUM. L. REV. 1704 (2007); Bell & Parchomovsky, *supra* note 149; Scott Duke Kominers & E. Glen Weyl, *Concordance Among Holdouts* (April 2010), *available at* http://www.people.fas.harvard.edu/~weyl/Holdout_4_10.pdf.

[183] The approach I discuss here is distinct from one in which entire communities would be given the opportunity to exercise a given option. *See, e.g.*, Rule, *supra* note 105, at 49-54 (describing a "Green Community Tax Credit" that might be offered by the state to communities that accommodate renewable energy uses).

[184] Margaret Levi uses the term "contingent consent" in a slightly different but analogous way. MARGARET LEVI, CONSENT, DISSENT, AND PATRIOTISM 19 (1997) (defining "contingent consent" as "a citizen's decision to comply or volunteer in response to demands from a government only if she perceives government as trustworthy and she is satisfied other citizens are also engaging in ethical reciprocity").

[185] *See* Groupon, Learn How Groupon Works, http://www.groupon.com/learn.

[186] *See id.*; *see also* Felix Salmon, Grouponomics, May 4, 2011 14:23, available at http://blogs.reuters.com/felix-salmon/2011/05/04/grouponomics (analyzing Groupon's business model).

[187] *See, e.g.*, JON ELSTER, THE CEMENT OF SOCIETY: A STUDY OF SOCIAL ORDER 42 (1989); Mark Bagnoli & Michael McKee, *Voluntary Contribution Games: Efficient Private Provision of Public Goods*, 29 ECON. INQUIRY 351 (1991). Indeed, Groupon's predecessor was The Point, which harnesses collective action in just such a manner. *See* G-Team: Groupon + The Point, http://www.groupon.com/g-team; The Point: Make Something Happen, http://www.thepoint.com/.

[188] *See, e.g.*, Michael Taylor & Hugh Ward, *Chickens, Whales, and Lumpy Goods: Alternative Models of Public-Goods Provision*, 30 POLIT. STUD. 350 (1982); Russell Hardin, *Group Provision of Step Goods*, 21 BEHAV. SCI. 101 (1976); Jean Hampton, *Free-Rider Problems in the Production of Collective Goods*, 3 ECON. & PHIL. 245 (1987).

need those ten nearest neighbors to consent.[189] And it is well-known that holdout problems can preclude assembly of such consent.[190]

What drives the holdout dynamic in multi-player aggregation settings boils down to the leverage that can be obtained by holding the last piece of a very valuable assembly.[191] Thus, one promising avenue is to make that leverage unavailable through mechanisms like "most favored nations" clauses that promise everyone who consents to a given assembly an equally valuable share of the assembly surplus, regardless of whether they agree to the deal early or late in the game.[192] Heterogeneity in valuation and other difficulties often make this approach (and others that similarly rely on pre-established divisions of surplus) hard to operationalize.[193] Hybrid approaches in which contingent consent triggers coercion once a certain numeric threshold is reached offer an alternative. Compulsory unitization of oil and gas interests is a prominent real-world example of this approach.[194]

A proposal by Peter Colwell works through another incarnation of this idea—a type of "tender offer" that might be made by a developer who wished to intensify use beyond the bounds permitted by existing law.[195] In Groupon-like fashion, the developer sends letters to the neighbors offering them money for their consent, but explaining that the deal will only "tip" when a certain percentage (say, 80%) agree; otherwise the deal is off.[196] The story doesn't end when the deal tips, however. With as few as 80% of the neighbors in agreement, something more is necessary, and that something more turns out to involve overriding the consent of those who did not accept the offer. In an interesting twist on the "most favored nation" approach, those who did not voluntarily accept the offer receive a somewhat lower amount than those who did, again to counter the usual holdout dynamic.[197] It is unsurprising that Colwell's proposal, like most other

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[189] This assumes that each of the neighbors would have the right to block the noise in a nuisance action, which might or might not be the case.

[190] *See, e.g.,* James M. Buchanan, *The Institutional Structure of Externality*, 14 PUBLIC CHOICE 69, 73-74 (1973).

[191] *See, e.g.,* Becker-Posner Blog, *The Kelo Case, Public Use, and Eminent Domain--Posner Comment*, June 26, 2005, 9:09 p.m., http://www.becker-posner-blog.com/2005/06/the-kelo-case-public-use-and-eminent-domain--posner-comment.html (describing right-of-way settings in which each owner "hopes to be the last holdout after the company has purchased an easement from every other landowner--easements that will be worthless if it doesn't obtain an easement from that last holdout").

[192] *See* Douglas Gary Lichtman**,** *Patent Holdouts in the Standard-Setting Process*, Academic Advisory Council Bulletin (Progress & Freedom Found., Washington, D.C.), May 2006, at 4, http://www.pff.org/issues-pubs/ip/bulletins/bulletin1.3patent.pdf (describing this approach in the patent context).

[193] *See, e.g.*, Gary D. Libecap, *Contracting for Property Rights*, in PROPERTY RIGHTS: COOPERATION, CONFLICT, AND LAW 142, 156-65 (Terry L. Anderson & Fred S. McChesney, eds., 2003) (discussing problems negotiating prospective division of proceeds and costs in the unitization context).

[194] *See id.* at 161-62 (discussing compulsory unitization).

[195] Peter F. Colwell, *Tender Mercies: Efficient and Equitable Land Use Change*, 25 REAL ESTATE ECON. 525 (1997).

[196] *Id.* at 532-33.

[197] *Id.* at 531

serious attempts to address aggregation problems in land use, contains an element of coercion (via supermajority rule) to get the job done.[198] A requirement of unanimous agreement sets a very high bar, and one that is likely to keep property entitlements stuck indefinitely in low-valued uses.[199] Put another way, we should not be surprised that coercion cannot be avoided altogether in reconfiguring property rights, if we understand ownership itself as involving a kind of coercion that operates against the rest of the world.

Nonetheless, a precautionary take on property rights might lead us to ask what kinds of voluntary entitlement reconfigurations would cost-effectively reduce the need for coercive realignments. Instead of attempting to construct a system that would fully substitute for familiar coercive mechanisms like zoning, eminent domain, and the use of damages remedies (liability rules) to override neighbor objections, we might consider instead how small innovations could make resort to those devices less necessary. An option exchange that offers a platform for non-coercive Groupon-like offerings in land use rights is an unexplored alternative. In cases where multiple configurations would suffice, a system for collecting options can offer a relatively low-cost way of determining how best to proceed.[200] Voluntary platforms for assembling relinquished veto rights could prove especially useful for projects that do not exhibit strict spatial complementarity (that is, where something under 100% participation would provide substantial benefits).

5. Quitclaiming

The discussion to this point has assumed, counterfactually, that the property rights in question are clear-cut as a legal matter and transparent to the parties. Often, this will not be the case.[201] Here the possibility that

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[198] *Id.*; *see also* Libecap, *supra* note 193, at 161-62 (compulsory unitization); Heller & Hills, *supra* note, at 182, at 1520-25 (discussing overrides of dissenters in land assembly districts and a number of related institutional structures); Robert H. Nelson, *Privatizing the Neighborhood: A Proposal to Replace Zoning with Private Collective Property Rights to Existing Neighborhoods*, 7 GEO. MASON L. REV. 827, 834 (1999) (supermajority rule for superimposing newly created neighborhood associations onto existing communities and binding all residents to the association's charter).

[199] JAMES M. BUCHANAN & GORDON TULLOCK, THE CALCULUS OF CONSENT: LOGICAL FOUNDATIONS OF CONSTITUTIONAL DEMOCRACY 63-72 & figs. 1-3 (1962) (discussing and illustrating the tradeoffs associated with moving away from a unanimity rule); *see also* Gerald Korngold, *Resolving the Intergenerational Conflicts of Real Property Law: Preserving Free Markets and Personal Autonomy for Future Generations*, 56 AM. U. L. REV. 1525, 1580 (2007) ("Eminent domain in the redevelopment context has been the public's key trump card to meet community needs, address market imperfections and holdouts, and advance the civic condition.").

[200] *See* text accompanying *infra* note 211 (discussing similar uses of options for pipelines). Options allow would-be assemblers to test the viability of various assemblies at relatively low cost, rather than being daunted by the prospect of encountering a holdout. Even if would-be holdouts exist in each potential assembly area, the bargaining power of each will be diminished by the competition provided by those in other potential assembly areas. I thank Ted Seto and Ed Iacobucci for discussions on these points.

[201] *See generally* Sterk, *supra* note 11.

parties might give up something that they may or may not actually own becomes interesting. The law already contains a mechanism that lets people do precisely this when conveying real property: the quitclaim deed. Such a deed amounts to a release of one's own claim, if any, on the property. Quitclaims can also convey interests less expansive than full fee estates.[202] For obvious reasons, a conveyance by quitclaim can be risky for the buyer; there may be another claimant in the woodwork.[203] Quitclaims are most useful where the person granting it is the only plausible claimant, aside from the recipient. In many cases involving potentially conflicting land uses, this criterion could be met. Hence, in the tree-solar example, the fact that the law might be unclear about whose interests will dominate in the event of a conflict would not preclude a precautionary quitclaim of a solar easement from the would-be tree grower to the would-be solar power user, or vice versa.

Of course, where incompatible uses are known, the government can simultaneously clarify rights and offer to buy options to transfer them. Where conflicting uses are yet unknown, the government can nonetheless facilitate broad and bundled relinquishments of the sort associated with the WYSIWYG alternative.[204] Some of what an owner cedes monopoly control over may not really turn out to be within her package of entitlements (or, as already suggested, might be removed from her bundle by regulatory action at a later date). Nonetheless, there are benefits of certainty and conflict avoidance that would be associated with a clear assignment of that element to another party. And if the underlying transaction holds value, so too would an option interface to facilitate it. To be sure, a land user who believes she does not need to purchase a given right can choose a different path—agitating for regulation or initiating (or provoking) a lawsuit, but those alternatives have costs of their own.

Returning again to the accident analogy, it is clear that we constantly do the equivalent of quitclaiming in everyday life to avoid conflict. We wave other motorists ahead of us, we step aside or stand still to let other pedestrians know that we are yielding to them, we pull our dogs to one side to avoid oncoming canines, and so on. In most of these cases, it is uncertain who has the right of way, and thus unclear whether we are complying with a duty we owe or giving up a right that we possess, yet the system works

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[202] *See, e.g.*, City of Manhattan Beach v. Superior Court, 13 Cal. 4th 232, 256-57 (1996) (Mosk, J., concurring and dissenting) ("[A]ny interest in land that can be conveyed by deed is conveyable by quitclaim deed. This includes an easement. . . . It even includes a reversionary interest such as a right to recover possession on breach of condition subsequent.) (citations omitted).

[203] Unsurprisingly, empirical work reflects a substantial discount for transfers subject to quitclaim deeds. *See* David Brasington & Robert F. Sarama, *Deed Types, Mortgage Rates, and House Prices*, 36 REAL ESTATE ECON. 587, 588 (2008) (finding, based on a data set of over 37,000 home sales, that "[h]ouses selling with general warranty deeds sell for almost 100% more than those selling with quit claim deeds").

[204] *See supra* Part II.C.1.

tolerably well.[205] Property is not currently set up in a way that makes similar informal adjustments easy to achieve, except where strong norms of neighborliness apply. And even a sustained attitude of neighborliness cannot answer the antecedent question of whether two owners engaging in potential conflicting uses should be neighbors in the first place. Setting up a system whereby owners can indicate their willingness to avoid confrontation over rights that they may or may not hold can add value in guiding those decisions.

To be sure, there are a welter of issues that surround any approach to legal uncertainty, including this one. For one thing, any popularized protocol for dealing with uncertainty may alter the law itself.[206] If people start routinely paying for solar easements, for example, the law might become less likely to grant solar users an entitlement to enjoy solar access gratis by, for example, prohibiting tall trees next door. But it is not obvious why this way of resolving legal uncertainty presents a particular problem.[207] It is also possible that a "paying for solar" norm would never emerge, given other ways that a system of options might interact with legal doctrine. For instance, the concessionary signal given by the putative owner might seem to invite neighbors to enjoy the benefits of an unused and obviously low-valued entitlement without paying for a transfer, especially when the law is uncertain about whether buying the easement is really necessary.[208]

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[205] *Cf.* ELLICKSON, *supra* note 58, at 52-56 (examining how, in rural Shasta County, norms coupled with an ethic of "live and let live" make legal rules largely irrelevant to day-to-day dealings). Perhaps more directly analogous to the situation of a landowner purchasing an easement that might be granted for free in court, consider the many instances in which people make payments that may or may not be required, simply in order to avoid conflict: adding an extra stamp to a letter that is ambiguously close to a given weight limit, adding quarters to a parking meter on a holiday that parking officials may or may not recognize, taking a less aggressive stance on a tax matter, and so on.

[206] *See, e.g.*, James Gibson, *Risk Aversion and Rights Accretion in Intellectual Property Law*, 116 YALE L.J. 882, 890-900 (2007) (describing a "feedback loop" in which copyright licensing prompted by risk aversion yields licensing practices that produce doctrinal constrictions of fair use); Jennifer Rothman *The Questionable Use of Custom in Intellectual Property*, 93 VA. L. REV. 1899, 1946-67 (2007) (critiquing the use of custom in intellectual property law on a variety of grounds, including the potential for entrenchment).

[207] The objection to doctrinal drift in the intellectual property context stems from a normative view on how limited or expansive the underlying rights should be. *See, e.g.*, Gibson, *supra* note 206, at 993 (arguing that the existing feedback loops will stifle creativity and compromise culture). Such drift would be equally undesirable in the land use context if we were certain that it would cause an augmentation of the entitlements of a party who is a lower-valuing user. Hence, a good reason for opposing a system of options for airplane overflight rights would be a concern that a pattern of micropayments for flight paths would ensue that would entrench owners' *ad coelum* rights and make every nonpaying airline liable—a bad outcome if we are pretty certain that the airline is always the higher valuing user. But where we are uncertain which of two rival uses will prove more valuable in a given time and place, options offer an alternative to litigation and lobbying. Takings law also interacts with entitlement transfer mechanisms in interesting, and to some extent countervailing, ways. For example, government would be less able to override solar access rights wholesale (as by enacting a "right to trees" law) if it had to pay just compensation to large numbers of people who have actually purchased solar easements thanks to an options system. In this case, an entrenchment in the direction of solar access (through buying easements) would counterbalance the entrenchment in the direction of preexisting rights to grow trees that the solar access sales might be thought to produce. Compare this with the copyright case, where widespread purchase of unnecessary rights is thought to entrench the rights of copyright holders without producing any countervailing enhancement of the legal position of those purchasing the unneeded rights. *See id.*

[208] This issue exists to some degree whether the law is clear or not, but it is intensified where the law is uncertain and known to be so, for the reasons suggested in the text.

Thus, we might actually see the opposite norm—that of *not* paying for solar—emerge. An owner's willingness to cede monopoly rights over a solar easement against a background of legal uncertainty might reassure a neighboring solar power user that solar access is unlikely to be blocked. It might seem implausible that an owner who signals that she doesn't much care about using her vertical space will risk losing a lawsuit and having to tear down improvements or destroy trees. Yet again, it is not clear why this is a particular problem. If a land use conflict is successfully avoided, the precautionary goals behind the option system have been fulfilled, whether through the signaling just suggested or through a transferred quitclaim that clarifies rights in favor of the solar user.

Going forward, a nonpaying solar user understands that legal uncertainty may be resolved against her, and thus understands that she invests in solar power at her own risk. She knows that her option-ceding neighbor may change his mind about trees, reclaim the option, and start a forest next door, or may sell to someone who will do so. Moreover, she recognizes that the possibility the law will be resolved against her grows as more and more solar users choose to purchase options and as solar easements become a more and more commonplace object of commerce. Thus the "rights accretion" and the "concessionary signal" theories may to some degree counterbalance each other, and even if they do not do so perfectly, there is no reason to suppose that their combined effects will be more deleterious for the overall path of the law than the status quo blend of litigation and lobbying.

III. OBJECTIONS AND CONNECTIONS

The ideas sketched above have opened up more avenues of inquiry than I can begin to pursue in this paper. This final Part is devoted to offering some brief thoughts on two sets of issues that bear on the feasibility and normative desirability of precautionary entitlement design. I begin by addressing some standard challenges, and then turn to discuss connections between the approach I suggest here and a variety of theoretical debates.

A. The Standard Questions

The suggestion that governmental entities become involved in delivering new forms of entitlement customization must first address some predictable objections, starting with the standard query: if this were such a good idea, wouldn't it already exist? Closely related is the question of whether government provision is really necessary or whether private

markets could suffice. Another question is whether the approach taken here really adds anything new, or whether we already have mechanisms that do everything that I am suggesting is necessary.

In fact, property entitlement customization does exist. Easements and covenants are firmly established entries in the property lexicon.[209] But for reasons already discussed, the most familiar incarnations of private covenants—networks of reciprocal restrictions that govern common interest communities—do not deliver the flexibility benefits that an option exchange could. The same goes for zoning and other types of top-down regulation. While it is certainly true that individuals can transact in a more piecemeal manner over entitlements, these transactions tend to become costly at exactly the same moment that they become most valuable. Private bargaining does sometimes occur, of course. To take a recent example, an energy company paid $5,000 to each household near its wind turbine operations that would agree not to complain about the noise.[210] Indeed, private systems of options are sometimes used to sidestep later bargaining difficulties. Pipeline companies in some places use options acquisition along multiple viable routes to work around holdout problems.[211] These cases, which involve the concentrated interest of a large entity that finds it cost-effective to assemble entitlements, largely prove the point, however: it is not realistic to suppose that individuals can initiate similar deals on a broad enough scale to be useful without some institutional assistance.

Why don't we have institutions that can facilitate such trades, then? Setting up an exchange to trade in future flexibility, before that flexibility is needed, represents a type of public good. Like a number of other undeveloped, innovative markets, the absence of a private option exchange might be attributed to the inability of innovators to capture enough of the gains associated with their innovations.[212] The fact that entitlement trading must occur in the shadow of potential governmental action and over long time horizons could make expected returns to private innovators unsustainably low, especially given the significant up-front investment required to offer the initial put options described above. Innovators may justifiably fear that property owners would be unwilling to try out a new system that will implicate their property rights over time without the

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[209] *See, e.g.,* Merrill & Smith, *supra* note 215, at 35-38; Nestor M. Davidson, *Standardization and Pluralism in Property Law*, 61 VAND. L. REV. 1597, 1607 (2008).

[210] *See, e.g.,* William Yardley, *Turbines Too Loud? Here, Take $5,000*, N.Y. Times, July 31, 2010.

[211] *See* comment on Volokh Conspiracy, 7/5/05 at 11:42 a.m., http://volkh.com/posts/1120508864.shtml#6471; National Energy Board, *Pipeline Regulation in Canada: A Guide for Landowners and the Public* 13 (2003) http://www.neb.gc.ca/clf-nsi/rsftyndthnvrnmnt/sfty/rfrncmtrl/pplnrgltnncnd-eng.pdf (explaining how and why companies might use option agreements rather than initially purchasing easements).

[212] *See, e.g.,* ROBERT J. SHILLER, MACRO MARKETS: CREATING INSTITUTIONS FOR MANAGING SOCIETY'S LARGEST ECONOMIC RISKS 207-08 (1993); Michael Abramowicz & John F. Duffy, *Intellectual Property for Market Experimentation,* 83 N.Y.U. L. REV. 337 (2008).

imprimatur of a governmental entity.

A related possibility is that other land use accident reduction mechanisms, notably zoning, have crowded out innovations in the domain of entitlement design. Perhaps developed initially as a substitute for missing insurance markets,[213] land use controls have now become entrenched institutional features, and ones that certain stakeholders and repeat players have a vested interest in maintaining. The costs of these familiar land use control mechanisms are significantly externalized as well, making them appear artificially affordable. Some of the external costs fall on other communities, as commentators have explored at great length. But some of the costs also fall on people living in future periods, who will face a constrained set of spatial choices.

These points, on their own, do not necessarily argue for public provision—subsidies might be used instead, coupled with a scaling back of public land use control. But they do suggest why we might not see a private actor emerge to handle trades in future land use flexibility. Other considerations, however, point toward the desirability of a public option exchange. One such consideration relates to the role of a central (even if geographically localized) system for delivering coordination and communication benefits,[214] as well as for establishing and implementing a consistent methodology for pricing. This point relates to the interaction between an option exchange and the *numerus clausus*, one of the points of theoretical intersection taken up in the next subpart.

B. Property Theory Intersections

The concept of precautionary entitlement design relates in interesting ways to, and is challenged by, several influential strains of property theory.

1. The *Numerus Clausus* Doctrine, *In Rem* Rights, and Exclusion

Perhaps the most direct challenge to the idea of a self-customizing approach to entitlements is found in a cluster of ideas associated with the work of Henry Smith and Thomas Merrill. Because their approach has increasingly set the terms of property theory discourse, it is worth recounting in some detail. According to Merrill and Smith, property entitlements are sensibly constrained to a limited number of standardized

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[213] *See* Albert Breton, *Neighborhood Selection and Zoning* in ISSUES IN URBAN PUBLIC ECONOMICS 241, 249 (Harold Hochman ed., 1973) (describing "zoning and restrictive covenants" as "imperfect substitutes" to insurance); *see also* WILLIAM A. FISCHEL, THE HOMEVOTER HYPOTHESIS 10 (2001) (discussing this point and citing Breton, *supra*).

[214] *See, e.g.*, Benito Arruñada, *Property Enforcement as Organized Consent*, 19 J. L. ECON. & ORG. 401, 425-28 (examining the role of a "territorial monopoly" in property recordation or registration given that *in rem* rights are involved).

forms, consistent with the principle of *numerus clausus*, to economize on information costs.[215] Unlike endlessly customizable contractual arrangements, property rights are *in rem*, "good against the world," and hence must speak in a simple and comprehensible language.[216] Although variations from these standard-issue property blocks are possible—property's lexicon includes easements, covenants, and so on—the basic forms are meant to simplify communication between owners and nonowners.[217]

For Merrill and Smith, property primarily communicates the simple message to "keep out."[218] Their focus on exclusion thus fits neatly together with both *in rem* rights and the *numerus clausus* doctrine. This is a fundamentally outward-facing vision of property.[219] Blocky, standard-issue rights play an important role in the story, as further suggested by Smith's work on modularity. For Smith, property is "modular" in that it delegates packages of control to the owner in opaque chunks.[220] That each "module" conceals information—the owner's choice among a broad range of projects and endeavors—is a strength rather than a weakness on this account.[221] The world at large need not concern itself (much) with what happens on the property, in Smith's view, because property's outer shell is outfitted with a clear "keep off" sign that tells the rest of the world all it needs to know.[222]

Putting together Merrill and Smith's emphasis on optimal standardization with Smith's focus on modularity leads to a view of property that might be summed up as follows: Lego on the outside, Play-Doh on the inside.[223] What happens inside the entitlement boundaries is up

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[215] *See, e.g.*, Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 YALE L.J. 1, 33-34 (2000) (suggesting that information cost savings can be realized by standardizing nonobservable elements of ownership); Merrill & Smith, *supra* note 4, at 358 (arguing that, due to the "informational burden" associated with *in rem* rights, "property is required to come in standardized packages that the layperson can understand at low cost").

[216] *See, e.g.*, Merrill & Smith, *supra* note 215, at 35-38 (analogizing property rights to language and noting some limits to the analogy).

[217] *See id.*

[218] *See, e.g.*, Merrill & Smith, *supra* note 4, at 394-95.

[219] *See* Katz, *supra* note 39, at 277 ("The focus of analysis for a boundary approach is on the position of *non-owners*, which it defines in terms of a general duty not to cross over the boundaries of objects one does not own.").

[220] *See, e.g.*, Henry E. Smith, *Community and Custom in Property*, 10 THEORETICAL INQ. L. 5, 16-18 (2009); *see also* Smith, *supra* note 53, at 1728, 1754-55 (discussing property as delegation).

[221] *See, e.g.*, Smith, *supra* note 162, at 969 (suggesting that owners are generally better than outsiders at evaluating uses of property, so that "it makes sense to make ownership a black box for some purposes"); Smith, *supra* note 220, at 17 (observing that information may be hidden within a module); Smith, *supra* note 153, at 1185 ("Exclusion rights implement the 'information hiding' or encapsulation that is the hallmark of modularity.").

[222] *See, e.g.*, Smith, *supra* note 220, at 17; *see also* Smith, *supra* note 53, at 1728 ("On the dutyholder side, the message is a simple one - to 'keep out.'"). Smith recognizes that beyond this exclusionary core lies a periphery where more nuanced and use-specific governance rules apply. Far from dismissing the interests at the periphery as unimportant, he takes it as a sign of their importance that they have been able to escape the "heavy gravitational pull of the exclusionary regime generally used to solve the basic need for stability and coordination." Smith, *supra note 221, at 965*.

[223] *See, e.g.*, Merrill & Smith, *supra* note 215 (discussing benefits of standardization); Smith, *supra* note 220, at 17 (noting the importance of the interface among modules and the relative unimportance to outsiders of

to the owner (within limits). In contrast, the shape of the outer interface is very much a matter of public interest, since it implicates the interactions between and among owners and nonowners, as well as buyers and sellers far into the future. Merrill and Smith's approach is not as stark as this brief summary might suggest—they fully recognize that governance mechanisms are required to control spillovers,[224] and further acknowledge that informational advances like registries can alter the efficient balance between standardization and customization.[225] Nonetheless, the potential tension between an exclusion-focused, standardized vision of property and technologies for facilitating owner-initiated entitlement customization should by now be evident.

At one level, nothing in a platform for trading in entitlement options is inconsistent with *numerus clausus*, since the ultimate objects of exchange are familiar entries in the property stable: easements and covenants.[226] But as I have argued in another context, mechanisms that dramatically lower the cost to the parties of altering property bundles are not the same creatures as old-fashioned pairwise bargains, even if the interests that are transacted over carry the same names.[227] If the internalized cost of customization falls, we would expect to see more of it. We thus must give serious attention to the possibility that the resulting reduction in standardization levels would generate externalities for third parties in the form of higher information costs.[228] Participants in a property system—those who buy, sell, hold, or fail to hold certain interests—bear much of the cost of administering the system, and these administrative costs are a crucial component in any cost minimization equation.[229]

Yet as Glen Robinson has observed, it is far from clear how a standardized, limited menu does much, if anything, to reduce the costs of complying with or transacting over property rights.[230] People need not know any details about how property is held to know that they hold no interest in it (beyond that which background principles may grant them, as through the public trust doctrine, or the doctrine of necessity). Whether the

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what happens inside); Smith, *supra* note 221, at 968-69 (same); Smith, *supra* note 153, at 1197 (using the Lego analogy to explain how modularity facilitates combining different basic property interests). An analogous distinction between the internal structuring of relationships and the external legal forms used by third parties is explored in Mary Anne Case, *Marriage Licenses*, 89 MINN. L. REV. 1758, 1781-83 (2005).

[224] Merrill & Smith, *supra* note 4, at 394-95.

[225] Merrill & Smith, *supra* note 215, at 38-42.

[226] It should also be noted that nothing in the approach outlined here would preclude parties from continuing to transact over land use entitlements in the traditional way, completely outside of the option exchange. Indeed, it is possible that the prices developed in the option exchange would provide a reference point for private negotiations that would help to facilitate transactions. This seems especially plausible if bargaining difficulties are often less a function of greed than of uncertainty over valuations and the fear of being "suckered" in a negotiation. I thank Ted Seto for this point.

[227] Fennell, *supra* note 173, at 893-94.

[228] *See* Merrill & Smith, *supra* note 215, at 26-34.

[229] CALABRESI, *supra* note 5, at 28.

[230] Glen O. Robinson, *Personal Property Servitudes*, 71 U. CHI. L. REV. 1449, 1484-88 (2004).

farm next door is held in an unusual variant on the fee tail[231] or in an ordinary fee simple absolute, nonowners know to keep off.[232] Conversely, those buying property are likely to be concerned about, and apt to incur costs gathering information about, plenty of things that are not encapsulated within the standardized forms—the condition of the property, the exact shape and terrain of the land,[233] the applicable zoning restrictions, and the ways in which elements like covenants and easements interact with a given fee estate.[234] A government-run option exchange, which would include a centralized database of completed and contingent claims on the property, would not add materially to the burden of investigating a property's attributes. Moreover, it would repay the effort with a great deal more clarity about the nature of neighbors' uses and plans, enriching at relatively low cost the information environment in which purchase decisions are made. An option exchange, then, seems to be just the sort of innovation that would justify a relaxation of the *numerus clausus* doctrine, even on Merrill and Smith's own account.[235]

Another facet of Merrill and Smith's vision of property might be put in terms of complementary entitlement packages. Their rejection of the "bundle of rights" metaphor and its implicit suggestion that property entitlements can be endlessly combined and recombined in any old way is premised on the idea that property has a stable core of meaning. This core is built on certain default sets of exclusion-based rights that fit together in ways that reduce information costs (here by relying primarily on the binary "on/off signals" that boundaries provide).[236] These default packages can work well if they place under a single owner's control a set of entitlements that tend to be strongly complementary.[237] But property in modern

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[231] For a case involving such an unusual interest, see Johnson v. Whiton, 34 N.E. 542 (Mass. 1893), *discussed in* Merrill & Smith, *supra* note 215, at 20-21, 24-25.

[232] This seems to follow from Smith's own analysis. *See* Smith, *supra* note 221, at 968 ("If I don't own Blackacre, most of the time I know to keep off regardless of what the owner's uses and plans are for the land."); see also Robinson, *supra* note 230, at 1485 (noting Smith's recognition of the different informational needs of different "audiences" and questioning how standardization of forms is helpful).

[233] The spatial configuration of land represents another dimension along which standardization might usefully proceed. *See* Gary D. Libecap & Dean Lueck, *Land Demarcation Systems*, in RESEARCH HANDBOOK ON THE ECONOMICS OF PROPERTY LAW 257 (Kenneth Ayotte & Henry E. Smith eds., 2011) (examining the impact of demarcation systems that generate land holdings in rectangular versus irregular configurations). Nothing in the option exchange idea would be inconsistent with using regular, rectangular land holdings as ownership platforms from which use rights might be traded; on the contrary, maintaining regularly-shaped boundaries would ease administrative burdens in tracking alterations in use rights.

[234] Robinson, *supra* note 230, at 1487-88. Merrill & Smith point out that some of the ways in which property fails to achieve standardization involve observable characteristics, such as parcel size or shape. *See* Merrill and Smith, *supra* note 215, at 34. But nonobservable elements can vary as well, as they recognize in discussing future interests that place various conditions on property. *See id.* at 14; see also Robinson *supra* note 230, at 1487-88 (noting that difficulties in assessing watch quality are similar in kind to difficulties that individuals might encounter in assessing an unusual timeshare arrangement involving the watch).

[235] *See* Merrill & Smith, *supra* note 215, at 38-42; *see also* Arruñada, *supra* note 214.

[236] *See, e.g.*, Henry E. Smith, *Exclusion and Property Rules in the Law of Nuisance*, 90 VA. L. REV. 965, 973 (2004) (explaining that "an exclusion regime builds on simple on/off signals such as boundary crossings").

[237] *See* Smith, *supra* note 153, at 1185, 1196 (discussing interaction between complementarity and

metropolitan contexts is heavily interdependent; influences on value that emanate from beyond the corners of the property regularly eclipse on-site influences. This fact calls into question any assumption that the control rights within a particular spatial shape are strong complements. Indeed, traditional land use controls already belie any strong spatial complementarity over control rights located within the owner's physical boundaries; ownership prerogatives are regularly chipped away in favor of collective property rights held by the community.[238]

What I suggest here is an ongoing and individualized process of finding what is complementary and what is not, based on the judgments that landowners themselves make. Because there are currently no good mechanisms for loosening monopoly control on undervalued components, what has been taken as strongly complementary may instead just be the product of inertia and the lack of useful market mechanisms. At a minimum, the intuitive case for strong spatial complementarity has been significantly undermined. Property is no longer a protected capsule in which the owner minds her own business; increasingly, what happens on or with property seems to be everyone's business. The suggestion this essay makes is that we explore the middle ground between public regulation and private dominion to find out when elements within the traditional spatial confines are best held not by the parcel owner, and not by the community, but rather by one or a few neighbors.

2. Incomplete Property Rights

The ideas in this paper also intersect with theoretical work on incomplete property rights.[239] Following the literature on incomplete contracts, this scholarship emphasizes the inevitable tradeoffs between "front end" definitions of rights and "back end" dispute resolution costs arising from ill-defined rights.[240] Thus, sharply defining rights ex ante—a form of precautionary entitlement design—might or might not be cost-justified in a given context.[241] On this account, conflicts brew when

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exclusion); Smith, *supra* note 13, at S471 (observing that "in general we would expect a tendency to see the world carved up into assets that embrace complementary sets of attributes, subject to the cost of doing so").

[238] *See* ROBERT H. NELSON, ZONING AND PROPERTY RIGHTS 15-18 (1977) (describing zoning as "a collective property right"); William A. Fischel, *Equity and Efficiency Aspects of Zoning Reform*, 27 PUB. POL'Y 301, 302 (1979) (explaining that zoning transfers property rights from landowners to the community).

[239] *See, e.g.*, Antonio Nicita et al. *Towards a Theory of Incomplete Property Rights*, American Law & Econ. Assoc. Ann. Meetings (2008) http://works.bepress.com/antonio_nicita/3; Amnon Lehavi, The *Dynamic Law of Property: Theorizing the Role of Legal Standards* 27-44 (June 2010), http://ssrn.com/abstract=1618768.

[240] *See, e.g.*, Robert E. Scott & George G. Triantis, *Incomplete Contracts and the Theory of Contract Design*, 56 CASE W. RES. 187 (2005) (focusing on this tradeoff in the context of incomplete contracts). Recent work examining this tradeoff in the property context includes Nicita et al., *supra* note 239, at 25 and Lehavi, *supra* note 239, at 12-13.

[241] This insight builds on Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 354–55 (1967); *see also* Sterk, *supra* note 11.

property rights are left incomplete (as they always must be, at some level). Antonio Nicita and his coauthors explain that as novel uses emerge, new "presumptive" rights accrue to owners based on the packages of rights they already hold.[242] The process may continue conflict-free, or the rights of two or more owners may collide, generating externalities and calling out for a sharper property definition.[243]

Incomplete property rights analysis offers one way of understanding emerging dilemmas like that between solar power users and tree growers; indeed, one of the examples that Nicita et al. discuss involves a tree that grows to block a view.[244] But this analysis is incomplete to the extent that it suggests all externalities are a product of ill-defined rights.[245] As the discussion above has emphasized, what makes property so conflict-prone is often the exact opposite—the fact that a person with a known right stands on it and refuses to budge, even when the right carries little value for her.[246] It is precisely this dynamic that has led some scholars to suggest that ambiguity in rights can actually improve bargaining.[247]

With this caveat in mind, there are two important takeaway lessons for the current project from the incomplete property literature. First is the basic but crucial point that sometimes pursuing a finer-grained property entitlement allocation ex ante will not be cost justified, whether because information about potential uses or conflicts is absent, or because the work of pinning down the respective rights exceeds the savings to be achieved from reducing conflicts.[248] Second, however, and directly relevant to the option exchange platform, is the possibility that rights definition can be an ongoing process in which the parties themselves participate. That

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[242] Nicita et al., *supra* note 239, at 13-15, 18.

[243] *Id.* at 15. The notion of presumptive rights shares some common ground with the principle of accession, which assigns rights to new property interests based on a prominent connection with existing property rights. *See* Thomas W. Merrill, *Accession and Original Ownership*, 1 J. OF LEGAL ANALYSIS 459 (2009). But while accession has been described as providing clear and unique answers, *see id.* at 475-76, the presumptive rights developed by Nicita et al. may ultimately conflict, producing externalities. *See* Nicita et al., *supra* note 239, at 15 ("*When two presumptive rights constitute a joint claim over a rival use they generate an externality*") (emphasis in original).

[244] Nicita et al., *supra* note 239, at 12-14 (building on an example borrowed from Alchian, *supra* note 124); *but see* Lehavi, *supra* note 239, at 34 (challenging the characterization of this conflict as a "new" dispute).

[245] *See* Nicita et al., *supra* note 239, at 26.

[246] *See, e.g.*, Christina Bohannan & Herbert Hovenkamp, *IP and Antitrust: Reformation and Harm*, 51 B.C. L. REV. 905, 968 (2010) (observing that "bilateral monopoly problems exist even when property rights are well-defined"). This problem could be characterized as a form of incompleteness: incomplete specification of who owns the right to which share of the surplus from trade. But this lack of specification is endemic to the notion of alienable, separately held entitlements—further specification of surplus division moves away from an economic model in which clearly defined rights are traded to one in which substitutes for trade are constructed.

[247] *See* Jason Scott Johnston, *Bargaining Under Rules versus Standards*, 11 J. L. ECON. & ORG. 256 (1995); Ayres & Talley, *supra* note 43, at 1027, 1034-35, 1073-78 (discussing and modeling this point, building on Johnston's insight); *see also supra* note 152 (discussing potential benefits of bargaining in the shadow of liability rules and noting disagreement in the literature).

[248] These costs include not only the ones that a legal system must incur to define and enforce rights, but also the costs that parties must incur to learn about these rights and how they apply in a given situation, and to track down the parties who hold them in order to negotiate a transfer. *See* Sterk, *supra* note 11, at 1296 (noting that these latter costs would exist "even when rules are, from an abstract legal perspective, crystal clear").

participation need not be limited to the polar extremes of bargaining and litigating, but can instead encompass a more nuanced interplay of signals and intentions that works to forestall conflicts as they begin to emerge. It is again helpful to consider a timeline in which potentially incompatible uses initially appear without much direct conflict, then grow more and more prevalent in increasingly closer proximity until a resolution of some sort is required. An option exchange can help to identify these emerging issues, reduce or delay conflicts over them, and provide data relevant to their ultimate resolution (whether through flexibly traded entitlements or through some other form of land use control).[249]

3. Abuse of Right

In recent theoretical work, Larissa Katz recommends addressing the costs of ownership in a different manner: by importing the civil law notion of "abuse of right" as an independent limit on ownership prerogatives.[250] This approach would seek to identify and outlaw those instances in which ownership rights are being used in a socially harmful way to hold up efficient new uses or to engage in inefficient spillover-producing activities.[251] If ownership can produce externalities, as I have suggested throughout this essay, abuse of right represents an effort to catch those externality generators who are producing the largest margins of harm over benefit—the property rights equivalent of identifying people who throw their empty bottles into the roadway. Yet, just as tracking down improper disposal can be costly—indeed, so costly that our goals may be better served by taxing all consumption and rewarding *proper* disposal—so too the task of determining when an owner is using entitlements improperly can generate excessive, and indeed prohibitive, costs.

Outside of a narrow category of "animus" situations, such as true spite fences, it is problematic to delineate what it means to be "abusing" one's right as an owner.[252] If we define "abuse" as misstating one's reservation price in an effort to get a larger share of the gains from trade, virtually every member of a market economy would be guilty. Most people assume that ownership carries with it the preorgative to say things like "I just can't part

[249] We might learn, for example, that a given entitlement type is always or almost always more valuable in one party's hands than another's, as is the case for ordinary airplane overflights. It might then become efficient to redefine default bundles so that the entitlement in question begins life in a different package than the one suggested by a "geometric box." *See* Sterk, *supra* note 12.

[250] Larissa M. Katz, *A Jurisdictional Principle of Abuse of Right* (2010), unpublished manuscript available at http://ssrn.com/abstract=1417955.

[251] *See id.*

[252] Katz argues for an abuse of right approach that would encompass both "animus" and "leverage" situations. *See id.* Although there may be proof problems in establishing animus, it is possible to draw a conceptual line around this category of actions by owners. Not so for the "leverage" category, which blends seamlessly into the ordinary bargaining that is generally thought to be an incident of ownership.

with this car for less than $8,000" even when $7,800 would really be sufficient. Indeed, as Katz herself puts it, "[o]wnership is generally seen as conferring a bargaining chip."[253] But a narrower definition of abusive leverage is as elusive as the broader definition is unworkable. The blockages that can dramatically impede efficient resolutions of land use disputes come down to nothing more than the misrepresentation of one's own reservation price (or an attempt to gain surplus based on the inferred reservation prices of others), under monopoly conditions.[254]

Instead of attempting to tell "good leverage" from "bad leverage," we might do better to recognize that all exercises of the veto rights conferred by ownership carry the potential to impose costs, insofar as they entrench a particular set of use rights to the exclusion of other, incompatible uses. Far from being an indictment of ownership, this point merely captures how ownership works. Rather than condemn ownership for doing what it does, we should price ownership so as to capture the effects of what it does. Because paying that price will be relatively cheaper for those who are using property in ways that generate gains for themselves, most of the abusive uses of leverage that Katz condemns would be effectively deterred, without our having had to identify them as independently problematic or distinguish them from everyday uses of leverage that accompany ownership.

CONCLUSION

Property, alone among entitlement types, delivers a hefty dose of personal control over a chunk of space for a potentially unlimited span of time. Its accompanying veto power makes ownership incomparably valuable and uniquely hazardous. While this power makes possible a wide range of projects and endeavors,[255] it also makes the rest of the world vulnerable to the ways in which that power may be deployed. Often the resulting collisions between power and vulnerability are efficient, but sometimes the power that property conveys is superfluous, of little or no value to the owners, but highly threatening to the potential projects of nonowners. This essay has focused on finding a way to render less

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[253] *See id.* at 39.

[254] *See* Harold Demsetz, *Theoretical Efficiency in Pollution Control: Comments on Comments*, 9 WESTERN ECON. J. 444 (1971); *see also* Harold Demsetz, *When Does the Rule of Liability Matter?* 1 J. LEGAL STUD. 13, 22-25 (1972). To be sure, we might distinguish especially egregious "pay me to stop" scenarios. In these cases, a user strategically engages in an activity that produces no net benefit for her, simply to extract money from her annoyed neighbor. For discussion of these tactics and some potential approaches to them, see Daniel B. Kelly, *Strategic Spillovers*, 111 COLUM. L. REV. (forthcoming 2011), draft available at SSRN: http://ssrn.com/abstract=1671692. The annoyer in these situations is misrepresenting not only the magnitude of her reservation price but also its sign, making the use itself, and not just her later posturing over it, socially wasteful.

[255] *See, e.g.*, Henry E. Smith, *Exclusion and Property Rules in the Law of Nuisance*, 90 VA. L. REV. 965, 1022 (2004) (explaining how exclusion protects a "wide and indefinite range of uses").

hazardous these low-valued portions of the property package.

The accident analogy is helpful in this endeavor. By forcing attention backwards to earlier decisions about the design of systems and entitlements, it draws attention to undertheorized accident avoidance techniques. Chief among these is entitlement design. In its current form, property is well on its way to becoming a clunker that spews spatial externalities, maneuvers like a tank, and regularly stalls out, creating bottlenecks that require the societal equivalents of tow trucks to rearrange things by main force. Keeping the models limited and doors locked will indeed keep property legible and distinctive, but it may also consign it to irrelevance as the realm of governance grows ever larger and the role of exclusion shrinks. It does no good to insist that property maintain a pristine standardized form on the outside if it will be gutted from within. If we wish to keep property alive as a distinctive concept, it must be able to respond more sensitively and flexibly to competing, spatially sensitive demands.[256] That means looking behind the "keep off" signs to recognize and price the incursions into flexibility that underlie that message.

As important as focusing attention in the right conceptual places is focusing attention on the right chooser.[257] I have suggested that, rather than leave the property configurations up to collectives, parties (as potential least cost avoiders) might be given incentives to customize their own entitlement packages. By doing so when (and only when) it is worthwhile for them, the total costs of land use accidents and their avoidance could be reduced. This essay has only begun to sketch how trading platforms in land use options might be constructed. But such transaction-cost mitigation systems are likely to become increasingly important if we hope to keep property on the road.

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[256] The relationship between flexibility and durability is a familiar but important theme in thinking about how institutions operate over time. *See, e.g.*, Korngold, *supra* note 199, at 1526-27 (recounting how Frank Lloyd Wright's Tokyo Imperial Hotel weathered the 1923 Great Kanto Earthquake through the use of a "floating foundation" and suggesting that legal doctrine should take to heart "[t]hese lessons of flexibility and humility in the face of inevitable change and the unknown"). *But see* David Super, *Against Flexibility*, 96 CORNELL L. REV. (forthcoming 2011) (examining some of the costs of retaining flexibility).

[257] *See* Krier & Schwab, *supra* note 17, at 470-71 (setting forth and discussing a "best-chooser axiom" that holds: "All other things being equal, when liability rules are used the party who is the best chooser should be confronted with the decision whether or not to force a sale upon the other party"). What the analysis in this article suggests is that one party might be the best positioned to decide whether to cede monopoly control, while a different party might be in the best position to decide whether to complete a transaction following that relinquishment.

Readers with comments should address them to:

Professor Lee Anne Fennell
University of Chicago Law School
1111 East 60th Street
Chicago, IL 60637
lfennell@uchicago.edu

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