

ARTICLES

Reconfiguring Property in Three Dimensions*Abraham Bell*[†] & *Gideon Parchomovsky*^{††}

INTRODUCTION

Every property problem spans three distinct dimensions: number of owners, scope of each owner's dominion, and asset design. These three basic dimensions can be traced back to Blackstone's famous encapsulation of property law as the "sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe."¹ Blackstone described the optimal dominion as absolute ("sole and despotic dominion"), the ideal number of owners as one ("a single man"), and the subject matter of property rights to be very broad ("over the external things of the world").²

Blackstone's description has proved a durable—albeit inaccurate—reference point for property theorists,³ who have directed their attention to each of the three dimensions identified by Blackstone—dominion, ownership, and asset—in descending order of importance.

As any first-year student knows, modern theorists have savaged the idea of "absolute dominion"⁴ and tend, instead, to view property as a "bundle of rights,"⁵ with no single, fixed "ownership right."⁶ Rather,

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¹ William Blackstone, *2 Commentaries on the Laws of England* *2 (Chicago 1979).

² See Robert C. Ellickson, *Property in Land*, 102 Yale L J 1315, 1362–63 (1993) (enumerating the Blackstonian package of private entitlements).

³ See, for example, id (relating the evolution of standard land interests to the Blackstonian ideal).

⁴ See Carol M. Rose, *Canons of Property Talk, or, Blackstone's Anxiety*, 108 Yale L J 601, 612 (1998) (referring to the "exclusive dominion" view of property as "artificial"); Bruce A. Ackerman, *Private Property and the Constitution* 26 (Yale 1977) ("[First-year property students] learn that only the ignorant think it meaningful to talk about owning things free and clear of further obligation.").

⁵ See generally James E. Penner, *The "Bundle of Rights" Picture of Property*, 43 UCLA L Rev 711 (1996). See also Ackerman, *Private Property* at 26 (cited in note 4) (explaining that

each right, power, privilege, or duty is but one stick in the total bundle.⁷ The ideal of property as driving toward a single owner fared much better and continues to enjoy a pride of place in contemporary property theory.⁸ “Things,” the third predicate of the Blackstonian edifice, has received the least attention. Primarily, modern scholars have challenged the idealized concept along two axes. First, they have questioned the exclusive focus on tangible goods as the subject matter of property, pointing out that intangible assets, such as intellectual works, may also be subject to private property rights.⁹ Second, in Anglo-American law, even when tangible objects are concerned, property rights attach to reified estates rather than the thing itself. Thus, properly understood, an owner does not own land but rather a fee simple absolute (or some other estate) in land.¹⁰ Yet, property theory is still searching for an accurate means of conveying the “‘thingness’ of private property.”¹¹

In this Article, we argue that the idealized Blackstonian characterization led many subsequent scholars astray: although Blackstone

property law “considers the way rights to use things may be parceled out amongst a host of competing resource users”).

⁶ A.M. Honore famously produced a list of no less than eleven “leading incidents” of property ownership. A.M. Honore, *Ownership*, in A.G. Guest, ed, *Oxford Essays in Jurisprudence* 107, 113 (Oxford 1961).

⁷ See generally, for example, Thomas W. Merrill, *Property and the Right to Exclude*, 77 *Neb L Rev* 730 (1998) (arguing that while property owners enjoy a varied package of legal rights, the right to exclude is both necessary and sufficient for identifying the existence of property).

⁸ Without specific reference to Blackstone, Harold Demsetz’s classic *Toward a Theory of Property Rights* posited that the law creates property rights over an object in order to allow a single owner to internalize the various externalities associated with that object. See generally Harold Demsetz, *Toward a Theory of Property Rights*, 57 *Am Econ Rev* 347 (1967). Demsetz’s insight about the centrality of a single owner as a means for internalizing externalities was further developed by scholars such as Richard Epstein, Michael Heller, and Francesco Parisi. See Richard A. Epstein, *Holdouts, Externalities, and the Single Owner: One More Salute to Ronald Coase*, 36 *J L & Econ* 553, 562–63 (1993) (stating that concentrating all the incidents of ownership in a single person minimizes the transaction costs of reallocating property to its best use); Michael A. Heller, *The Tragedy of the Anti-commons: Property in Transition from Marx to Markets*, 111 *Harv L Rev* 621, 631 (1998) (arguing that in regimes transitioning from socialism to private markets, the resources that emerge as private property most successfully are those that begin the transition with a near-standard bundle of rights assigned to a single person); Francesco Parisi, *Entropy in Property*, 50 *Am J Comp L* 595, 613–17 (2002) (discussing legal mechanisms that promote reunification of fragmented property in a single owner).

⁹ See, for example, Frank H. Easterbrook, *Intellectual Property Is Still Property*, 13 *Harv J L & Pub Policy* 108, 118 (1990) (arguing that, except in the rarest case, the law should treat intellectual and tangible property identically). But see Mark R. Patterson, *When Is Property Intellectual? The Leveraging Problem*, 73 *S Cal L Rev* 1133, 1138–39 (2000) (discussing special antitrust difficulties presented by intellectual property).

¹⁰ See Robert W. Gordon, *Paradoxical Property*, in John Brewer and Susan Staves, eds, *Early Modern Conceptions of Property* 95, 100 (Routledge 1995) (critically discussing the historic process of reification by which estates became independent assets subject to ownership).

¹¹ Michael A. Heller, *The Boundaries of Private Property*, 108 *Yale L J* 1163, 1193 (1998) (identifying the bundle-of-legal-relations metaphor as a weak portrayal of the “thingness” of private property).

correctly identified the building blocks of property law, property law does not and cannot achieve the Blackstonian ideal.¹² The key to this paradox is to be found in the fact that property law cannot be explained by scholarly investigations that isolate one of the three Blackstonian factors from the others.¹³

Property puzzles can rarely be understood using one-dimensional analysis. The ideals of a single owner, full dominion, and optimal assets often conflict among themselves. Thus, property law must on many occasions compromise its pursuit of one of the ideals for the other. Rules that drive toward creating the ideal number of owners must interact with rules seeking to create or preserve the ideal asset size together with the ideal package of legal powers and rights. Overlooking one of the dimensions leads to an incomplete, and often distorted, view of the field. Unfortunately, there has been no systematic three-dimensional analysis of property rules.

The goal of this Article is to develop a comprehensive understanding of property law by conceptualizing it as a three-dimensional balancing act. Viewing property in this light yields several important contributions to the burgeoning literature on property theory.

First, a three-dimensional conceptualization offers a far more varied picture than is commonly acknowledged. As needs change along one or more of the axes—owner, dominion, or asset—the overall concept of the property right must be adjusted accordingly in order to maintain maximum benefit from property rights. Consequently, when the law pushes for the Blackstonian ideal of absolute dominion of a single owner over things, it inexorably finds itself drawn into a more compromised stance. Property law, therefore, is a balancing act: as property rights fall out of sync on one dimension, the law must adjust its protections on other dimensions in order to maximize property rights. We demonstrate the importance of this general theoretical insight by illustrating how a three-dimensional perspective challenges conventional understanding of such property issues as appropriation rules, commons property, fragmentation of rights, nuisance, and land assembly.

¹² It is important to note that Blackstone himself acknowledged the complexity of property notwithstanding the idealized conception. In this sense, what is referred to as the Blackstonian conception of property is a misnomer. Consider Ellickson, 102 Yale L J at 1362–63 & n 237 (cited in note 2) (summarizing what has subsequently become known as the “Blackstonian Bundle of Rights” but immediately admitting that this characterization “is most uncharitable to Blackstone,” who recognized many of the complexities and nuances of property law).

¹³ An important precursor to our Article is Shi-Ling Hsu, *A Two-dimensional Framework for Analyzing Property Rights Regimes*, 36 UC Davis L Rev 813 (2003), which examined two of the three dimensions: owner and dominion.

Second, the perspective we develop in this Article illuminates six strategies property law employs to diffuse the tension among its constitutive dimensions. These six strategies are as follows:

Fictional owners. In order to maintain some of the advantages of having a single owner even though there are multiple individuals who actually own rights, the law often concentrates ownership in assets in a single *fictional* owner. The most outstanding example of this is corporate-owned property. Other instances include partnerships, decedents' estates, and married couples.

Fictional assets. A second strategy is the creation of fictional assets, so as to slice up a "thing" into pieces small enough to be amenable to full dominion by a single owner. This strategy lies behind the reification of property rights and explains why the law insists upon ownership of estates (such as fees simple) rather than land or chattels. The use of this fiction enables a single owner of a future interest and a single owner of a present interest to each enjoy relatively uncompromised dominion (subject only to the rules of waste) over full and separate—albeit fictional—assets.

Forced reconfiguration. This strategy primarily involves rules forcing owners to relinquish fractional property interests to a single owner. Examples include partition by sale, the (infamous) Rule against Perpetuities, disentailing, and, most importantly, takings by eminent domain for purposes of land assembly. In cases of land assembly, takings allow the government to simultaneously change the number of owners (typically to one) and the asset size (typically to a larger asset).¹⁴

Limits on owner-initiated reconfiguration or size. In order to preserve ideal asset size or configuration, the law often confines the ability of an owner to change the size of her real estate parcel without the state's permission. For example, zoning regulations limit the ability of a lot owner to divide it physically into smaller lots without permission to parcelize from local authorities.¹⁵

¹⁴ Takings may also be employed to force an owner of an interest in a large asset to divide the asset to permit the creation of single owners over each of the smaller assets. Such was the case in *Hawaii Housing Authority v Midkiff*, 467 US 229 (1984), where legislation forced owners to sell fee simple interests, through intermediaries, to their tenants in order to combat the problem of excessively concentrated land ownership in Hawaii. See *id.* at 232–34.

¹⁵ See Kenneth H. Young, 4 *Anderson's American Law of Zoning* § 25.03 at 284–89 (Clark Boardman Callaghan 4th ed 1997) (discussing the objectives of subdivision controls). Sometimes the restriction is imposed on metaphysical, rather than physical, alterations, as evidenced by the *numerus clausus* principle that prevents individuals from creating new property rights. A variant on this strategy, which we may label "forced presentism," curbs or eliminates the owner's power to interfere with future owners' dominion over an asset. Thus, the law prevents unreasonable restraints on alienation and discharges servitudes in light of changed circumstances. Some applications of the doctrine of waste also employ forced presentism. These rules preserve as close to full dominion as possible over time.

Transfer or elimination of elements of dominion. The goal of this strategy is to restrict the dominion of the owner in possession by either transferring certain rights or privileges to others or by eliminating them altogether. It enables lawmakers to hold asset size or configuration constant, while compromising the owner's dominion. The traditional example is the doctrine of waste, which restricted the tenant in possession from using the property to the detriment of other co-owners.¹⁶ Modern examples of this strategy include conservation easements, which transfer to a third party control over certain environmental amenities on private land without depriving the owner of her fee simple, and use restrictions in zoning laws, which eliminate certain use privileges from the owner's domain.

Differential acquisition rules. A final strategy polices the degree and timing of privatization of assets. Thus, some resources are subject to a rule of capture, encouraging rapid assimilation into the domain of private property; others are subject to rules such as reasonable use or public trust that prevent full transition to private property. This strategy enables policymakers to keep certain assets' characteristics subject to other nonprivate property regimes.

We show that the entire law of property can be organized around these six reconciliatory strategies. Hence, we offer a clear and coherent way of understanding property law in its entirety.

Our final contribution is normative. We draw on these strategies to craft new solutions to longstanding property puzzles. For example, consider some of the examples of excessive "fragmentation" of property discussed by Michael Heller¹⁷ and Francesco Parisi.¹⁸ These include such situations as traditional Native American tribal lands. In order to keep ownership of land within the tribe, federal law imposed restrictions on the alienability of tribal members-owners' property interests. After a few generations, tribal land holdings were characterized by a plethora of owners with extremely small and undivided shares, which led to underuse and abandonment.¹⁹ Both Heller and Parisi pointed out excessive fragmentation of property interests leads

¹⁶ Other legal mechanisms employed to this end include trusts, some kinds of servitudes, and many kinds of zoning or environmental laws. We include trusts in this category even though we acknowledge that, in some respects, trusts also fall under the category of fictional owners, as well as having characteristics of fictional assets.

¹⁷ See Heller, 111 Harv L Rev at 679–87 (cited in note 8) (introducing and discussing "the tragedy of the anticommons," which results in the underuse of resources).

¹⁸ See Parisi, 50 Am J Comp L at 599–600, 626–27 (cited in note 8).

¹⁹ *Hodel v Irving*, 481 US 704, 707–08 (1987) (discussing the process by which "40-, 80-, and 160-acre parcels became splintered into multiple undivided interests in land, with some parcels having hundreds, and many parcels having dozens, of owners").

to too many undivided interests in an asset.²⁰ Focusing their attention on that dimension *alone*, each of them argued that the solution should focus on limiting fragmentation or forcing aggregation.

Once one views the problem, as we do, as spanning three dimensions, innovative solutions come to light. For instance, rather than attempt to aggregate the asset held by multiple owners, one may utilize a strategy of creating a fictional owner, such as a tribal cooperative, with tribal member-owners exchanging their undivided fractional interests in the land for shares in the cooperative. Alternatively, one might create a tribal trust to manage the land with tribal members retaining undivided fractional beneficial interests. Finally, policymakers might consider making the land freely alienable and formalizing limited nonpossessory tribal rights to protect traditional land uses.²¹

Likewise, consider the example of eminent domain. Eminent domain is frequently analyzed in the context of land assembly; indeed, some scholars view land assembly as the quintessential and perhaps only legitimate justification for the eminent domain power.²² Eminent domain is justified in the case of land assembly as the necessary solution for strategic holdouts that may prevent the state from aggregating a number of smaller parcels in order to provide a public good with the new, assembled parcel. A three-dimensional analysis recognizes that the problem may be viewed in several ways: too many owners, too small assets, or too much dominion (power to hold out). Holdout problems may be resolved, therefore, along all three dimensions. As we explain in detail in Part IV, instead of using eminent domain to aggregate the assets, the state can aggregate the owners, as it does in forced pooling arrangements in oil and gas law.²³ Or, it may change the acquisition rules to permit would-be assemblers to force sales for certain uses.²⁴

Structurally, the Article unfolds in four Parts. Part I introduces a theoretical framework for understanding the interplay of the three dimensions of property. In particular, we show that both private actors in the marketplace and policymakers defining property rights must aim at maximizing property value as a function of three variables. Part II of the Article reviews current scholarship of property with an eye toward teasing out doctrines where analysis has been led astray by

²⁰ See Heller, 111 Harv L Rev at 685–87 (cited in note 8); Parisi, 50 Am J Comp L at 599–600, 626–27 (cited in note 8).

²¹ See Part IV.A.

²² See, for example, Michael Heller and Rick Hills, *Land Assembly Districts*, 121 Harv L Rev 1465, 1467 (2008).

²³ See Part IV.D.

²⁴ See Abraham Bell, *Private Takings* 33–37 (unpublished manuscript, 2007) (discussing government-mediated private takings in which the government uses its eminent domain power to allow private actors to seize property).

failing to take account of all three dimensions of property. In each case, we examine the interplay of the three dimensions of property and show why property doctrines must take account of all three dimensions at once. Part III elaborates the strategies actually employed by the law to deal with the uneasily reconciled needs of value maximization along three dimensions and maps these strategies onto current doctrine. Part IV presents normative suggestions, demonstrating that many of the three-dimensional strategies of property policymakers may be used in new contexts.

I. ORDERING PROPERTY IN THREE DIMENSIONS

Property is always a three-dimensional puzzle, comprising owners, assets, and dominion. Property is three-dimensional not only in the private realm, where people have to consider how to allocate their rights over assets, but also in the public realm where government must create and police legal property forms to meet private needs.

To illustrate, consider one of the most basic problems of property law: what to do when owners of property in common decide to part ways. The law formally recognizes two basic options. One is to preserve the owners' identities and divide the *asset* among the different owners. The other is to maintain the asset's unity and change the identity of the *owner(s)* by selling the asset and dividing the proceeds. The law labels these two options "partition in kind" and "partition by sale" respectively.²⁵ In truth, however, the choice standing before a judge is not binary.

In addition to the two recognized options, courts have the possibility of holding both asset unity and owner identity constant, while adjusting the *rights* (or dominion) of the owners. While the law has no formal label for this option, courts have already made decisions of this type. This, for example, was the course chosen by the Surrogate's Court in *In re McDowell*,²⁶ where the disputants were siblings arguing about the ownership of their deceased father's old rocking chair.²⁷ The court ruled that, as heirs, the siblings each owned a share in the chair and that the two would have to trade off possession of the chair every six months.²⁸ In other words, the court rejected the traditional owner-oriented and asset-oriented resolutions of partition problems and instead invented one oriented toward dominion through forced time-sharing.

²⁵ See Richard R. Powell, 7 *Powell on Real Property* § 50.07[4]-[5] at 50-47 to 50-51 (Matthew Bender 2007) (Michael Allan Wolf, ed).

²⁶ 345 NYS2d 828 (Sur Ct 1973).

²⁷ See *id* at 829.

²⁸ See *id* at 830 (failing to address the issue as one of partition but rather describing it as one of resolving ownership).

We argue that it is not surprising that, in resolving partition disputes, courts may act along one or more of three axes: owner, asset, or dominion. Three-dimensionality is the defining characteristic of property rights. As such, any definition or adjustment of property rights necessarily involves a puzzle of maximizing value as a function of three variables.

In this Part, we demonstrate and justify the ubiquity of three-dimensional concerns in the law of property. We claim that the importance of the three concerns and the tensions among them stem from the very nature of property. We discuss this claim from two divergent vantage points: private ordering and public ordering of property regimes. We show that both the private and public order continuously shuffle property rights and forms to maximize value in light of the concerns of owner, asset, and dominion.

A. Three-dimensional Property Basics

Before embarking on our examination of how private parties and lawmakers order property rights in three dimensions, we begin with the simple observation that the definition of property rights must, by its nature, involve delineation along the three dimensions of owner, asset, and dominion. Consider, for example, the heart of Harold Demsetz's famous analysis in *Toward a Theory of Property Rights*.²⁹ Demsetz sought to explain how property rights naturally evolve whenever a scarce resource becomes valuable, and he illustrated his thesis by describing the emergence of property rights in land—specifically, in hunting territories in Canada's Labrador Peninsula. According to Demsetz, private property rights emerged when it became sufficiently valuable to those concerned to internalize benefits and costs.³⁰

This internalization can be accomplished only by specifying owner, asset, and dominion. The property right must specify the owner (in whom the benefits and costs are internalized), the territory over which this ownership extends, and the rights included in ownership. Indeed, it is impossible to conceive of allocating property without specifying all three aspects of ownership. There cannot be ownership in land without some clear idea of who owns the land, what land is owned, and what rights accrue to the owner as a result of her status.³¹

²⁹ Harold Demsetz, *Toward a Theory of Property Rights*, 57 *Am Econ Rev* 347 (1967).

³⁰ See *id.* at 354.

³¹ Admittedly, one might conceive of another dimension of property specification: time. However, as our example demonstrates, durability of property rights is easily accommodated within the dimensions of asset and dominion.

Like most writers, Demsetz assumed, without ever stating so explicitly, that the typical property right partakes of the Blackstonian ideal of a single owner with absolute dominion (full internalization) over a thing. In the example of the hunting grounds, this entails a single person owning a marked-off area and having absolute rights over the area, including, most importantly, exclusion and use rights. The Blackstonian ideal therefore serves as the idealized goal of property definition.

Upon further analysis, however, the surface attractiveness of the Blackstonian ideal breaks down. The goal of providing a single owner with absolute dominion over a thing often proves unreachable, leaving owners and the policymakers the challenge of maximizing property value as a function of three variables that do not always move in a correlated fashion.

Consider, for example, the management of property rights in a beautifully designed residential home. One might suspect that optimal production of such homes would be achieved by defining legal property rights in such homes in absolute Blackstonian fashion, permitting the potential builder of such a home to internalize all utility created by such a home, thereby allowing the builder to calculate whether to make the investment based on full internalized enjoyment and cost.

However, this initial impulse is probably wrong. The house will almost certainly last beyond the lifetime of the builder, and the beauty will almost certainly be enjoyed, at least in part, by passersby with whom the builder will have no practical ability to bargain for internalization. This means that the utility of the home will certainly spill over to nonowners. In particular, the utility enjoyed by the builder-owner from the asset will necessarily end at her death; she may only enjoy vicarious utility from the anticipation of her heirs' or grantees' enjoyment. In this example, as in many others, the Blackstonian model of property rights cannot possibly create full internalization.

The optimal definition of property rights must compromise between the impulse to concentrate the property right in the hands of one person—here the builder-owner—and the contrary impulse to divide the property rights among those who will necessarily enjoy at least part of the benefit of the “thing” in question—the home. Optimization of property rights requires compromise upon at least one dimension.

Property rights may be adjusted along any or all three of the dimensions. The beautiful home with spillovers may be placed under the ownership of the builder and passersby. The builder may be left with full ownership of part of the building but be stripped of ownership of the exterior (ownership of which might be handed over to passersby). Or, most likely, both the ownership and asset configuration may be

left intact, while some of the owner's dominion rights to alter the building's exterior are stripped away.³²

Where asset reconfiguration is difficult, compromises in ownership structure or owner dominion are likely strategies. Consider, for example, Robert Ellickson's examination of ownership structures in land. As Ellickson notes, scale efficiencies vary for assets among different uses and users:

For example, . . . the optimal territorial scale of the Coase College campus, given its educational purposes, is 200 acres. But the optimal scale for exploitation of the oil pool beneath Coase is 7777 acres. And when Coase rents living space to a sophomore, an optimal space is a[n] . . . interest in a 150-square-foot dormitory

room.³³ Aggregation and disaggregation of parcels in order to permit each use as it becomes most efficient is not an easy matter. Moreover, most lands have multiple simultaneous uses, meaning that for many purposes a parcel size is suboptimal or supraoptimal for one particular use while optimal for another. Sometimes, the result is various kinds of collective ownership, such as kibbutzim.³⁴ More often, the problems in asset size are dealt with through compromised rights as embodied in zoning law.

However, the reification of property rights in Anglo-American law means that, even in realty, asset configuration often plays a special role in optimizing value given tensions along property's three dimensions. While it is not easy physically to divide a home so as to provide for different ownership of different rooms, it is less difficult to divide abstract estates in land. For instance, the physical home may remain intact while the abstract legal asset (that is, the fee simple) is divided into two: a life estate and a remainder. This means that, in Anglo-American law, asset reconfiguration often proves a better means of maximizing property value than aggregating ownership or reducing the package of ownership rights.³⁵

³² See, for example, *United States v Blackman*, 613 SE2d 442, 444–45 (Va 2005) (concerning a servitude forcing the owner of a historical home to preserve its appearance).

³³ Ellickson, 102 Yale L J at 1332–33 (cited in note 2).

³⁴ See *id.* at 1347–48.

³⁵ Reification of rights, together with a post-Hohfeldian view of property rights as a “bundle of sticks,” poses a challenge for those examining the three dimensions of property. Specifically, if property is merely a collection of owner rights—dominion, in our terminology—what does it mean to speak of a property “asset”? The answer is that even when the defined property asset is purely an abstraction, it is still conceived of as distinct from the dominion over it. For instance, if the property right consists of a right to profit from an idea, the idea is the asset; and the profit right, the dominion. Property rules always partake of distinct dimensions of dominion and asset because they are rights in rem. Thus, even if the protected *res* is merely abstract, it must be defined or conceived of in some fashion before one can proceed to defining the rights comprising owner dominion.

B. Three Dimensions of Private Ordering of Property

Private property owners work to maximize property value as a function of three dimensions through contract. The importance of the ownership-asset-dominion triangle in contractual arrangements is a central theme in the property rights writings of Yoram Barzel (albeit without explicit acknowledgement of the role of any of the three dimensions).³⁶ Barzel sought to elaborate a model of the development of what he termed “economic property rights” through contractual arrangements that exploit changes in private cost functions. Barzel’s theory focuses on how private parties allocate property rights through contract and other arrangements.³⁷ While his work centers on value allocation, a careful examination of the model reveals that, in Barzel’s world, private parties take advantage of the three dimensions of owner, asset, and dominion in defining their property rights.³⁸

For example, Barzel observed that gas station owners responded to changes in gasoline prices following conflicts in the Middle East not only by rationing supplies according to waiting times in queue³⁹ but also by reconfiguring the asset sold. Deprived of the ability to reprice the asset on account of price controls, station owners altered the asset sold by reducing the quality of gasoline (measured by octane rating) and stripped away auxiliary services previously bundled with the gaso-

³⁶ See Yoram Barzel, *Economic Analysis of Property Rights* 33 (Cambridge 2d ed 1997).

³⁷ See *id.* at 33–54 (using the tenant-farmer–landlord relationship as an example of how parties will maximize value by shifting contract form).

³⁸ Barzel’s concept of property rights differs significantly from that generally embraced by legal scholars and therefore requires some initial explanation. In contrast with the theories discussed in the previous Part, Barzel’s theory views property as a post hoc description of the ability to enjoy value from a given service or asset. Notably, this description of property differs from a legal package of rights or even a legal recognition of the ability to enjoy value. See *id.* at 3. See also Thomas W. Merrill and Henry E. Smith, *What Happened to Property in Law and Economics?*, 111 *Yale L J* 357, 358 (2001):

[U]pon closer inspection, all this property-talk among legal economists is not about any distinctive type of right. To [] a greater extent than even the legal scholars, modern economists assume that property consists of an ad hoc collection of rights in resources. Indeed, there is a tendency among economists to use the term property “to describe virtually every device—public or private, common-law or regulatory, contractual or governmental, formal or informal—by which divergences between private and social costs or benefits are reduced.”

Quoting Richard A. Posner, *Economic Analysis of Law* 53 (Aspen 5th ed 1998). The touchstone of Barzel’s analysis is transaction cost economics as pioneered by Ronald Coase. In relevant part, this branch of economics treats legal entitlements as unimportant so long as transaction costs are sufficiently small. See R.H. Coase, *The Problem of Social Cost*, 3 *J L & Econ* 1, 1–15 (1960). Thus, Barzel had good reason to relegate questions of legal property to a secondary role in his investigation. Nonetheless, Barzel’s discussion of property rights is valuable in delineating the interplay of the dimensions of property as understood by more traditional property scholarship.

³⁹ See Barzel, *Economic Analysis of Property Rights* at 24 (cited in note 36) (explaining that by setting a price ceiling below the market-clearing price, a part of the rights to the gasoline was placed in the public domain and could be acquired by buyers who joined the queue).

line.⁴⁰ Barzel similarly noted that assets conveyed in labor contracts⁴¹ and realty rentals,⁴² and also asset and risk allocations such as insurance contracts,⁴³ were altered over time by the markets or by changes in production and cost functions, whether due to regulation, improved production techniques, or other developments.

Barzel also analyzed changes in ownership configurations in response to production functions by examining the role of corporations,⁴⁴ split control through leaseholds,⁴⁵ and other cooperative mechanisms⁴⁶ in the efficient exploitation of economic property rights. Barzel followed Ronald Coase in viewing both property rights and organizational forms as fundamental questions of transaction costs.⁴⁷ However, Barzel reversed Coase's order of priority by describing organizational forms as seen through the lens of economic property rights. Barzel's theory sees sole ownership as an ideal that reduces transaction costs, but only at the cost of decreasing the ability to specialize. Thus, ownership configurations, according to Barzel, aim to obtain the benefits of specialization by slicing up attributes of property so as to enable, as much as possible, each attribute to belong to a single owner.⁴⁸

For example, according to Barzel, the purpose of the firm is not to *divide* ownership among many individuals, but rather, to provide a limited insurance mechanism to each of the individual worker-owners selling their output.⁴⁹ Corporations are not simply a network of contracts;⁵⁰ they

⁴⁰ Id at 27–29. Auxiliary services included pumping gas, washing windows, and checking engine oil.

⁴¹ See id at 78–80 (explaining how contractual arrangements between workers and employers vary in order to expose each of the parties to different levels of variability).

⁴² See id at 45–49 (discussing how lease contract attributes, such as maintenance responsibilities, are assigned to the party that can better affect the value of the output by manipulating that attribute).

⁴³ See id at 60–62, 64 (noting that fire insurers are the “efficient owners” of a building's attribute of fire hazard since fire insurers, rather than titleholders, are specialists in minimizing fire hazard).

⁴⁴ See id at 65–84.

⁴⁵ See id at 33–54 (“Together owners of labor and owners of land . . . will adopt the contract form that generates the largest net output value.”).

⁴⁶ See id at 55–64 (examining the complex structuring of rights associated with large-scale equipment and office buildings).

⁴⁷ See id at 11 (“The presence of positive transaction costs is what makes the study of property rights significant.”).

⁴⁸ See id at 51–53.

⁴⁹ See id at 81 (defining the scope of the firm as “the set of contracts whose variability is contractually guaranteed by common equity capital”).

⁵⁰ The description of corporations as a network of contracts was proposed by Michael Jensen and William Meckling. See Michael C. Jensen and William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure*, 3 J Fin Econ 305, 310–11 (1976) (describing most organizations as legal fictions, “which serve as a nexus for a set of contracting relationships among individuals”) (emphasis omitted).

are a network of single owners, each selling her property rights, together with a network of guarantors providing limited financing.⁵¹

Barzel's analysis is particularly important for our purposes, as it comes against Coase's background view of legal definitions of property as of purely secondary importance.⁵² Barzel's work demonstrates that even in the absence of legal restraints, owners and would-be owners constantly juggle their ownership to achieve the optimal combination of number of owners, asset control, and asset configuration. Different abilities to enjoy profits from specialization, changes in societal tastes and technology, changing values of inputs, substitutes and complements, and a host of other factors combine to alter constantly the value of ownership. Within the limitations imposed by transaction costs, owners respond by altering one or more of the three factors to return assets to the most productive use for them. Sometimes owners rearrange ownership structures into corporations or other fictional forms; sometimes they reconfigure their assets into different bundles; sometimes they yield or seize rights of control over their assets. Owners may abandon parts of assets to the public domain in order to protect more cost-effectively what remains.⁵³

Assume, for example, a large empty tract of land, Largeacre, controlled by Jane. Jane can go about extracting value from Largeacre in a variety of ways involving all three dimensions we discuss. She can assert sole and complete dominion over the entire tract and use the tract herself. She can hire the help of others in order to manage and use the land, thereby yielding a certain degree of her dominion over the tract. She can add other owners to help her manage and use the land by creating a tenancy in common, thereby yielding a certain degree of her dominion over the tract. Alternatively, she can mortgage part of the tract in order to raise money that she can then use to improve the land. She can subdivide into multiple lots and sell each of the smaller lots to a different single owner. She can set up a corporation that would own Largeacre and sell shares in the corporation to investors. Her decision on this score will involve some juggling of her rights, the introduction of other "owners," and configuring the asset or dominion over it, all in order to maximize the value extracted from her property rights. In short, in the Barzelian world, "owners" adjust

⁵¹ Whereas Jensen and Meckling's theory is referred to as "nexus of contracts," Barzel refers to a firm as a "nexus of outcome guarantees." Barzel, *Economic Analysis of Property Rights* at 81 (cited in note 36).

⁵² See note 38.

⁵³ See generally Douglas W. Allen, *The Rhino's Horn: Incomplete Property Rights and the Optimal Value of an Asset*, 31 J Legal Stud 339 (2002) (discussing optimizing asset value for owners by partial destruction of the asset).

their position along all three dimensions in an attempt to maximize the value they derive from their assets.

The case of copyrights in musical compositions provides a real world example of three-dimensional adjustment. One of the exclusive rights the law grants to copyright owners is the right to perform the work in public.⁵⁴ The right to control public performances of musical works is a potentially valuable right, but it is notoriously difficult to enforce.⁵⁵ Illegal public performances of musical works can occur in multiple places at once, often leaving no trace of the infringement after the fact. These characteristics combine to make it very difficult for individual copyright owners to extract the full value embedded in the public performance right. The high cost of monitoring illegal performances and suing putative infringers make enforcement on an individual basis impractical.

Copyright owners responded to this challenge by forming performance rights collectives, such as American Society of Composers, Authors and Publishers (ASCAP) and Broadcast Music, Inc (BMI), which manage and enforce public performance rights on a collective basis.⁵⁶ Individual owners chose to compromise their dominion by ceding their exclusive control over public performances of their works to the aforementioned collectives and accepting in exchange a share of the royalties collected by the organizations. Robert Merges described copyright owners' decisions to opt in to a collective management and enforcement ownership as a transition from a strong property model, under which each owner has full control of her works, to a liability rule model, under which copyright owners voluntarily agree to accept the royalties determined by their collective of choice.⁵⁷ In our terminology, the copyright owners responded to the high cost of enforcing public performance rights by adjusting their rights on the dominion dimension.⁵⁸

⁵⁴ See 17 USC § 106(4) (2000).

⁵⁵ See, for example, Jay M. Fujitani, Comment, *Controlling the Market Power of Performing Rights Societies: An Administrative Substitute for Antitrust Regulation*, 72 Cal L Rev 103, 105 (1984) (describing how “[t]he ephemeral nature of public performances [that] made it difficult for copyright owners to detect unauthorized performances of their works” led to the creation of organizations for the enforcement of performance rights).

⁵⁶ See W. Jonathan Cardi, *Über-middleman: Reshaping the Broken Landscape of Music Copyright*, 92 Iowa L Rev 835, 844 (2007) (“ASCAP . . . is famous for stories of its employees, cloaked in ASCAP-emblazoned jackets, patrolling local concerts, stores, restaurants, and nightclubs in search of . . . businesses that perform songs publicly without permission.”). See also Stanley M. Besen, Sheila N. Kirby, and Steven C. Salop, *An Economic Analysis of Copyright Collectives*, 78 Va L Rev 383, 385–90 (1992).

⁵⁷ See Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 Cal L Rev 1293, 1303 (1996).

⁵⁸ An alternative owner-asset adjustment might involve copyright owners transferring the copyrights themselves to the collectives.

Over time, technology created a new challenge for copyright holders in musical works: filesharing. The emergence of the internet, together with email and peer-to-peer applications, greatly increased the scope of unlawful exchange and distribution of music files. According to some estimates, at the height of the practice, almost one billion files were illegally shared every month.⁵⁹

Copyright owners adopted a two-pronged approach to the new challenge. First, the content industry adopted encryption and other technological protection measures to make copying more difficult. Second, owners of valuable copyright portfolios persuaded Congress to pass legislation enhancing the penalties for internet copying and barring the circumvention of technological protection measures.⁶⁰ The new legislation expanded the powers of copyright holders vis-à-vis potential file sharers by making it more difficult and costly for the latter to access and use copyrighted content without permission.⁶¹ Without the new legislation, the technological self-help measures were of limited effectiveness since hackers always found ways to defeat them.⁶² By siding with the copyright owners, Congress improved their position of the copyright holders in the technological war they were waging on hackers and file sharers. In our terms, once again, the legislation adjusted property rights along the dominion dimension.

But this was not the end of the story. Obviously, the new law could not achieve absolute deterrence, and congressional intervention was not enough on its own to end illegal filesharing. The ban on circumvention has proven to be difficult to enforce and many file sharers have

⁵⁹ See Inducing Infringement of Copyrights Act of 2004, Hearings on S 2560 before the Senate Committee on the Judiciary, 108th Cong. 2d Sess (2004) (testimony of Mitch Bainwol, Chairman and CEO, Recording Industry Association of America), online at http://judiciary.senate.gov/testimony.cfm?id=1276&wit_id=3753 (visited June 8, 2008).

⁶⁰ See Digital Millennium Copyright Act (DMCA), Pub L No 105-304, 112 Stat 2860 (1998), codified in relevant part at 17 USC §§ 1201–05 (2000). For a discussion of the content industry's role in the enactment of the DMCA, see Jessica Litman, *Digital Copyright* 122–49 (Prometheus 2001).

⁶¹ See Pamela Samuelson and Suzanne Scotchmer, *The Law and Economics of Reverse Engineering*, 111 Yale L J 1575, 1640 (2002) (pointing out that “[m]ost users have neither the inclination nor the ability to circumvent a technical protection measure”). See also Jack Goldsmith and Tim Wu, *Who Controls the Internet?* 107–25 (Oxford 2006) (describing how the litigation that marked the demise of Kazaa also meant that file trading groups avoiding government detection would be harder to find by ordinary users).

⁶² See, for example, Peter K. Yu, *Anticircumvention and Anti-anticircumvention*, 84 Denver U L Rev 13, 23 (2006) (noting that there are “no perfect, hacker-proof” technological protection measures); Fred von Lohmann, *Measuring the Digital Millennium Copyright Act against the Darknet: Implications for the Regulation of Technological Protection Measures*, 24 Loyola LA Enter L Rev 635, 638 (2004) (“Proponents of the DMCA’s anti-circumvention provisions were not naïve about the technological infallibility of [technical protection measures]. They admitted that no technology would be foolproof against every hacker bent on compromising it.”).

not been deterred.⁶³ Given the low likelihood of enforcement, internet users all over the world deem the cost savings from illegal filesharing (forgone expenditures on CDs and the like) greater than the expected cost from enhanced legal liability. This has led the music industry to reconfigure its most valuable asset—the package by which it delivers music (and attendant limited copyright licenses). The dominant package of prior decades—the music album on vinyl, tape, or CD—is essentially a bundled good.⁶⁴ It typically contains two or three hits and a number of track fillers. Traditionally, music lovers had little use for the track fillers but put up with them to enjoy the hits with which they were bundled.⁶⁵ However, filesharing gave music owners the opportunity to “unbundle” the good and gain direct access to hits they wanted. Realizing this, in recent years, the music industry has altered the configuration of the asset by unbundling the package and selling music on a per track basis. Online music sites, such as iTunes, sell music by the song, affording buyers significant cost savings.⁶⁶ Importantly, the reconfiguration of the assets lowered the attractiveness of illegal filesharing in the United States. And in 2006, “[t]he number of households downloading legally almost caught up to the number of homes that download illegally via peer-to-peer . . . file-sharing networks.”⁶⁷

C. Three Dimensions of Public Ordering of Property

In the previous Part, we argued that when left to their own devices, private actors will naturally develop property rights that tend to maximize value as a function of the three dimensions of ownership, asset configuration, and owner dominion. As we demonstrated in the example of filesharing, these rearrangements will often involve changes in law as well as contractual arrangements. Ideally, lawmakers, too, should aim for three-dimensional maximization. While the state is not an “efficient” producer of property rights such that one should expect the legal market to “clear” at optimal property rights definition, the

⁶³ See von Lohmann, 24 *Loyola LA Enter L Rev* at 639 (cited in note 62) (stating that the DMCA anticircumvention provisions have not been of any help to content owners). But see Paul Ohm, *The Myth of the Superuser: Fear, Risk, and Harm Online*, 41 *UC Davis L Rev* 1327, 1398 (2008).

⁶⁴ See Christopher Sprigman, *The 99¢ Question*, 5 *J Telecommun & High Tech L* 87, 90–91 (2006).

⁶⁵ Indeed, track fillers, or filler songs, are often called “throwaways.” Consider Glynn S. Lunney, Jr., *Fair Use and Market Failure: Sony Revisited*, 82 *BU L Rev* 975, 1028 n 193 (2002) (suggesting that “a full-length CD consists of four tracks that consumers want and another six to eight tracks of filler songs”).

⁶⁶ See, for example, Randal C. Picker, *Mistrust-based Digital Rights Management*, 5 *J Telecommun & High Tech L* 47, 67 (2006).

⁶⁷ See Joseph Palenchar, *NPD: Illegal Downloads Outpacing Legal Downloads*, *Twice* (Mar 14, 2007), online at <http://www.twice.com/article/CA6424429.html> (visited June 8, 2008).

state often maneuvers to improve property definitions at the request of property “consumers” (constituents and lobbyists).⁶⁸ Naturally, legally defined property must take account of all three dimensions.

To understand how lawmakers define property rights, we first seek to ascertain the importance of government definition of property rights in light of private autonomy in shaping contractual rights.

One function of government regulation is illustrated by the example of filesharing. State law is a collective action mechanism that in some cases proves the most cost-effective way for private individuals to arrange their property rights.⁶⁹ Additionally, once government defines property rights, state definitions often take the place of (or reduce the price of) private contractual orderings.⁷⁰ After all, why should parties to a property contract reinvent the wheel and classify anew their rights to utilize a given asset when they may adopt definitions already provided by the state?

A second, more important function of government regulation of property rights is to establish rights beyond the contractual scope of parties to bargain with another—that is, in those cases where transaction costs bar effective bargaining between all potentially relevant parties to ownership. This theme was developed in three interrelated articles by Thomas Merrill and Henry Smith, who sought to explain the importance of property law in a post-Coasean world.⁷¹ Merrill and Smith argued that because property rights deal with an indefinitely large class of individuals who may encounter a given asset, property law is essential for managing the costs of conveying information about rights.⁷² Property law accomplishes this by going beyond simply establishing default rules for contracting parties.⁷³ Under the rule of *nume-*

⁶⁸ Rent-seeking is prevalent in the production of legal property rules, as in any other political activity, and there is no reason to believe therefore that every property change will improve net welfare. Indeed, we discuss a number of badly designed property definitions in Part IV.

⁶⁹ See Barzel, *Economic Analysis of Property Rights* at 98–104 (cited in note 36) (discussing the government’s role in delineating property rights through dispute settlement and by placing assets which are very costly to police into the public domain); Richard A. Epstein, *The Allocation of the Commons: Parking on Public Roads*, 31 J Legal Stud 515, 518 (2002) (asserting that where there is little risk of overuse of a common-pool asset, gains from more efficient allocation of the asset may be offset by increases in administrative costs).

⁷⁰ See, for example, Ellickson, 102 Yale L J at 1368–71 (cited in note 2).

⁷¹ See generally Merrill and Smith, 111 Yale L J 357 (cited in note 38); Thomas W. Merrill and Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 Yale L J 1 (2000); Thomas W. Merrill and Henry E. Smith, *The Property/Contract Interface*, 101 Colum L Rev 773 (2001).

⁷² See Merrill and Smith, 110 Yale L J at 26–27 (cited in note 71) (justifying the *numerus clausus* principle as a means for controlling an “externality involving measurement costs: Parties who create new property rights will not take into account the full magnitude of the measurement costs they impose on strangers to the title”).

⁷³ See Merrill and Smith, 111 Yale L J at 394 (cited in note 38).

rus clausus, property law limits the ability of private parties to create new property forms contractually.⁷⁴

Viewed more broadly, Merrill and Smith's property writings remind us that property rights, as defined by the government, are rights in rem, which avail against the world—even those who have not bargained with the defined owner. Because the costs of transacting with other potentially affected users of any given asset are often prohibitively high, the public definition of property rights is frequently dispositive.⁷⁵ This means that while private ordering may determine the shape of property rights in instances where the value of the order exceeds transaction costs (including, but not limited to, the information costs described by Merrill and Smith), private parties will often find that transaction costs are sufficiently high to bar such ordering. Consequently, for a wide range of potential users or possessors of assets, the government definition of property rights is the important one.

The Blackstonian ideal of property as absolute dominion of a single owner over a thing retains broad political appeal, as can be seen in such disparate political movements as opposition to eminent domain, support for the use of force in defense of property, and demands for sharper restrictions on the ability of law enforcement officials to enter private homes. At the same time, it must be recognized that property rights are not often easily bundled into neat Blackstonian packages. Instead, the law must shuffle legal protections in order to maximize the value of property rights over time as a function of the three crucial elements of assets, unitary ownership, and dominion. This cannot be accomplished by stubborn adherence to the Blackstonian ideal, but rather by taking account of high transaction costs and expected variability in tastes and technology, and by defining and redefining property rights in order to encourage private management and facilitate transferability and specialization. Sometimes, this occurs at the expense of one or the other of the Blackstonian ideals.

The goal of government-defined property rights is not to achieve optimization in any individual bargain; this task may be left to the individual contracting parties at hand. Rather, lawmakers ideally define property rights in order to achieve optimization in the many cases

⁷⁴ See Merrill and Smith, 110 Yale L J at 4 (cited in note 71).

⁷⁵ See Abraham Bell and Gideon Parchomovsky, *A Theory of Property*, 90 Cornell L Rev 531, 533 (2005) ("Because it is practically impossible for contracts to arrange most of society's relationships, property law determines most of the legal interactions regarding assets among people."); Merrill and Smith, 111 Yale L J at 393–94 (cited in note 38) (arguing that if property is a bundle of rights, some bundles are much easier to communicate than others and therefore have an information-cost advantage).

where affected parties cannot bargain due to transaction costs. As with private parties, lawmakers must work along all three dimensions.

Consider again the example of property rights in a durable and beautiful house. Not only are many of the beneficiaries of utility from the house outside of the reach of potential transactions (due to high transaction costs), many are as yet unborn and cannot express any preferences whatsoever. In this case, a single owner of absolute dominion over the entire home for eternity may well reconfigure property rights in such a manner as to maximize her own utility to society's aggregate loss because the utility of passersby and future generations will be taken into account only to such a degree as the owner can enjoy vicarious benefit. For example, the owner may impose a durable burden on title in the home that produces a small amount of present psychic enjoyment but that places a long-term high cost on the enjoyment of future generations. Lawmakers can work to counteract such developments by restricting the owner's ability to reconfigure the asset and compromise future owners' rights by, for example, limiting the ability to impose some kinds of restraints on alienability or by enforcement of a *numerus clausus* rule that forbids willy-nilly creation of new estates in land.⁷⁶

In Part III, we consider more systematically the strategies actually used by lawmakers to maximize property value given three-dimensional tensions. We argue that, on closer analysis, many of the contours of property law can be interpreted as lawmakers' attempts, for better or worse, to juggle the needs of the three dimensions of property. But we first demonstrate, in Part II, how lack of attention to the three-dimensionality of property problems has distorted our understanding of central property themes.

II. THE MISSING DIMENSIONS OF PROPERTY ANALYSIS

In this Part, we discuss how the three-dimensionality of property manifests itself in numerous doctrines. We illustrate three-dimensionality's importance in understanding the challenges of property law and show how insufficient attention to this fact has led renowned property theorists astray.

A. The "Fragmentation" of Property Rights

We begin with some of the puzzles recognized in the writings of Heller as well as Parisi. In a series of papers, Michael Heller identified a problem that he labeled "excessive fragmentation of property rights"

⁷⁶ To be sure, there is no reason to be certain that lawmakers will act correctly in order to ensure optimal value preservation for future generations.

and, in particular, the problem of anticommons.⁷⁷ In Heller's account, anticommons occur where an asset is shared by too many owners possessing excessively small asset shares. This over-fragmentation of ownership creates a situation where no owner has sufficient power to utilize the asset and none has sufficient incentive to jointly manage the asset given high transaction costs.⁷⁸ The result is underutilization of property.

Heller built on this insight to explain and justify several of property's most exotic doctrines. For example, Heller described the "tortuous Rule Against Perpetuities" as an attempt to "limit inter-temporal fragmentation."⁷⁹ Likewise, he explained the *numerus clausus* principle that limits private creation of new property forms on the same grounds.⁸⁰

Heller also criticized some property doctrines for opening the door to excessive fragmentation. For example, he noted that the law of servitudes permits division and allocation of property rights in order to encourage "good fragmentation" but cautioned that the law's flexibility might serve as a "one way ratchet," leading to over-fragmentation, locking property into suboptimal uses.⁸¹ This, he said, is a particular danger facing common-interest developments (such as condominium buildings and gated communities), which deliberately create extensive networks of reciprocal servitudes.⁸²

Extending Heller's analysis, Parisi described the tendency toward excessive fragmentation as a one-directional bias towards entropy in property.⁸³ Parisi argued that the problem might be even more troubling than Heller might have realized, due to asymmetric transaction costs: while the cost of dividing property among multiple holders is quite low, the cost of reaggregating it is often prohibitive.⁸⁴

⁷⁷ See generally Heller, 111 Harv L Rev 621 (cited in note 8); Heller, 108 Yale L J 1163 (cited in note 11); Michael A Heller, *The Dynamic Analytics of Property Law*, 2 Theoretical Inquiries in L 79 (2001) (proposing anticommons as a fourth ideal type of property, to be added to the standard trilogy of private, commons, and state property). The concept was first introduced by Frank Michelman. See Frank I. Michelman, *Ethics, Economics, and the Law of Property*, in J. Roland Pennock and John W. Chapman, eds, *NOMOS XXIV: Ethics, Economics, and the Law* 3, 6 (NYU 1982).

⁷⁸ See Heller, 111 Harv L Rev at 633–42 (cited in note 8).

⁷⁹ Heller, 108 Yale L J at 1179 (cited in note 11).

⁸⁰ See *id.* at 1177 (noting how judges reduced the costs of intertemporal fragmentation by restricting the fee tail).

⁸¹ See *id.* at 1183–84 (explaining how fragmenting governance among a group of owners may promote good fragmentation), 1165–66 (noting that "[b]ecause of high transaction costs, strategic behaviors, and cognitive biases, people may find it easier to divide property than to recombine it").

⁸² See *id.* at 1183–85 (predicting that without the restriction of members' veto rights, common-interest communities "may fall further and further behind their productivity frontier").

⁸³ See Parisi, 50 Am J Comp L at 626–27 (cited in note 8).

⁸⁴ See *id.* at 627. For other discussions of the fragmentation problem in property, see generally Lee Anne Fennell, *Common Interest Tragedies*, 98 Nw U L Rev 907 (2004); Reza Dibadj,

By our lights, the important contributions of Heller and Parisi fall short of their full potential by paying insufficient attention to the three-dimensionality of property. As their terminology suggests, both tend to view asset size as a given and focus on the number and type of ownership shares.⁸⁵ Thus, each focuses on the danger of excessive fragmentation of ownership while failing to notice that in some cases the law must encourage fragmentation of ownership shares in order to maximize value on other axes. For instance, in many common-interest developments, the ideal asset configuration for unit owners includes a series of servitudes ensuring quiet, clean and safe surroundings, neighbors with similar preferences for local amenities, and aesthetically harmonious exteriors. From a condominium unit owner's perspective, the problem may be not that a large asset is divided among too many owners, but rather that alternative asset configurations are too small or ill-fitting to ensure all the attributes that they want in their property. Owning a unit in a common-interest development enables owners to achieve new asset configurations that allow them to enjoy amenities without having to assemble all the attributes they value into one large individually owned parcel. The clash between the demands of the asset configuration (maximum value at substantial "fragmentation" of unit ownership) and single ownership (maximum value at zero "fragmentation") leads, in such cases, to overall maximum value at substantial fragmentation. Thus, it is not surprising that many individuals are eager to live in common-interest developments notwithstanding limitations that should theoretically lower asset value. Nor is it surprising that courts have been willing to develop the law of servitudes in ways that encourage fragmentation.

By focusing on fragmentation, Heller and Parisi do not pay sufficient heed to the fact that property law not only seeks to block too many owners but also to drive toward an optimal asset configuration. Thus "fragmentation" that looks undesirable on one dimension because it creates too many owners looks highly desirable on another dimension because it creates the optimal "thing" subject to property. This claim can be stated more broadly: the fragmentation other theorists view as an anomaly appears very rational when one includes the dimen-

Regulatory Givings and the Anticommons, 64 Ohio St L J 1041 (2003); Hsu, 36 UC Davis L Rev 813 (cited in note 13); Dan Hunter, *Cyberspace as Place and the Tragedy of the Digital Anticommons*, 91 Cal L Rev 439, 509-13 (2003); James M. Buchanan and Yong J. Yoon, *Symmetric Tragedies: Commons and Anticommons*, 43 J L & Econ 1 (2000).

⁸⁵ It should be noted, though, that Parisi also analyzes the dominion-related aspects of fragmentation. See Parisi, 50 Am J Comp L at 609-10, 614-15 (cited in note 8). See also Ben W.F. Depoorter and Francesco Parisi, *Fragmentation of Property Rights: A Functional Interpretation of the Law of Servitudes*, 3 Global Jurist Frontiers, Issue 1, Article 2, at 3 (2003), online at <http://www.bepress.com/gj/frontiers/vol3/iss1/art2/> (visited June 8, 2008).

sion of asset size and configuration in the analysis. Indeed, in a three-dimensional model of property law, oftentimes the law must be as concerned with insufficient fragmentation as with excessive fragmentation.

B. Commons Property

In her work, Carol Rose has studied various common property forms. Rose has posited that the persistence of common property poses a puzzle to champions of private property, who maintain that common property regimes lead to overuse of assets and depletion of resources. She has noted that “the nineteenth-century common law of property in both Britain and America, with surprising consistency, recognized two distinguishable types of public property.”⁸⁶ The first is “property ‘owned’ and actively managed by a governmental body.”⁸⁷ The other is “property collectively ‘owned’ and ‘managed’ by society at large, with claims independent of and indeed superior to the claims of any purported governmental manager”—a category that most would call common property but that Rose dubs “inherently public property.”⁸⁸ Rose has pointed out that the law employed such doctrines as prescriptive easements, public trust, and custom to protect the claims of the general public to such assets as pathways, waterways, shores, and hunting grounds.⁸⁹

Why did those assets remain inherently public? One cause is fear of monopolization and holdouts. Rose used this rationale to justify the recognition of public rights in passageways.⁹⁰ She pointed out, though, that the holdout rationale is unconvincing when applied to “such public trust uses as swimming, fishing, and hunting.”⁹¹ Recreational uses may occur in many different places and hence there is no reason to grant use rights to the public in a specific lot.⁹² Therefore Rose explained the legal recognition of public rights in recreational uses on the grounds of economies of scale and maximization of group welfare. For instance, Rose argued that value would rise for each participant in a periodic communal dance as each new participant joined. In her words, recreational activities “have value precisely because they reinforce the solidarity and fellow-feeling of the whole community; thus

⁸⁶ Carol M. Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U Chi L Rev 711, 720 (1986).

⁸⁷ *Id.*

⁸⁸ *Id.*

⁸⁹ See *id.* at 722.

⁹⁰ See *id.* at 752 (“Without public prescription doctrine, each owner along the way might bar the passage at will and siphon off its public value.”).

⁹¹ *Id.* at 758.

⁹² *Id.*

the more members of the community who participate, even if only as observers, the better for all.”⁹³

An obvious difficulty with Rose’s reliance on economies of scale and network effects is that they do not lend any particular support for favoring common property over private property. Telecommunications display strong network effects—that is, within a range, the addition of each user increases the value of the service for all others—yet the network is predicated on private property.⁹⁴ The same is true of credit cards and various types of computer software such as operating systems.⁹⁵

The three-dimensional view offers an alternative way to understand the problem. The existence of common properties is indeed at odds with property law’s preference for a single owner. However, ownership, or the number of owners, is not the only dimension the law must optimize. When asset size or configuration is added to the analysis, it becomes apparent that in some cases the ideal number of owners is not necessarily one.

The choice between a single private owner and multiple owners involves an important tradeoff. Private ownership sometimes gives rise to a problem of underconsumption. This problem occurs when assets are too large to be consumed by a single individual but extraordinarily costly or physically impossible to divide. In such cases, optimal use of the assets requires the owner to share the consumption of the asset with others. However, such sharing involves transaction costs. As a result, some particularly large assets may remain underutilized. Common property, as was noted numerous times in the past, displays the opposite problem of overconsumption.⁹⁶

Accordingly, where very large assets are concerned, lawmakers face a choice between two types of costs. They can push towards dividing and reconfiguring the asset into smaller units and establishing private property rights in the smaller units or subject it to common property and accept the cost of overconsumption. Depending on their particular configuration, there can be assets for which the cost of reconfiguration and privatization are greater than the cost of overconsumption. For example, the cost of formalizing and enforcing rights in navigable waters might be much higher than the cost of overuse under

⁹³ Id at 767–68.

⁹⁴ Compare Mark A. Lemley and Philip J. Weiser, *Should Property or Liability Rules Govern Information?*, 85 *Tex L Rev* 783, 812 (2007) (explaining how the failure of the FCC’s unbundling program in the telecommunications industry can be attributed to a misunderstanding of “semi-commons” property, where one firm has legal access to use the private property of another).

⁹⁵ See Carl Shapiro, *Exclusivity in Network Industries*, 7 *Geo Mason L Rev* 673, 673 (1999).

⁹⁶ See Garrett Hardin, *The Tragedy of the Commons*, 162 *Science* 1243, 1244 (1968).

common property. In such cases, it makes sense to subject the asset to common ownership.

C. First Possession

In an important contribution to the canon of property scholarship, Richard Epstein discussed the centrality of the concept of a single owner to the design of efficient legal rules.⁹⁷ Epstein argued that when high transaction costs prevent efficient allocation of resources through contracts, lawmakers should “refer to the test of the ‘single owner’ as a way to think about structuring legal relationships across separate persons in a way that maximizes their joint output, when cooperative behavior among them is not possible.”⁹⁸ According to Epstein, the turn to the single-owner test will best aid the government in attempting to approximate the results of hypothetical transactions among private actors when high transaction costs prevent such transacting from actually occurring. Epstein proceeded to note that in designing specific doctrines, lawmakers should consider the potential of the rules to generate externalities and holdouts.⁹⁹

Epstein used this framework to explain such property doctrines as first possession. He defended first possession as a principle of appropriation of rights. Epstein admitted that the doctrine of first possession itself creates negative externalities.¹⁰⁰ However, he justified it on the ground that it lowers correction costs relative to alternative collective allocation mechanisms.¹⁰¹ In a world with positive transaction costs, pace Epstein, the cost of correcting mistakes in the initial allocation far outweigh the negative externalities generated by the first possession doctrine.¹⁰²

Epstein next turned his attention to the question of dominion, or design of the optimal bundle of rights, that first possession should receive. He maintained that the common law’s decision to fashion ownership to entail “possession, use and disposition [] is an effort to overcome the problem of subsequent transactions costs by giving a single person the control over *all relevant aspects* of a single *thing*.”¹⁰³

Unfortunately, Epstein stopped short of addressing the third dimension of asset specification, disposing of it by simply referring to all

⁹⁷ See Epstein, 36 J L & Econ at 562–63 (cited in note 8).

⁹⁸ Id at 556.

⁹⁹ See id at 557 (maintaining that “the purpose of all legal rules is to minimize the sum of the costs that are associated with these two forms of bargaining obstacles”).

¹⁰⁰ See id at 561.

¹⁰¹ See id at 562 (basing this statement on “[a] rough empirical guess”).

¹⁰² See id at 562–63.

¹⁰³ Id at 562 (emphasis added).

objects of first possession as “thing[s].” From a three-dimensional lens, the issue of asset specification is crucial, and, without reference to it, it is impossible to offer a comprehensive justification for first possession.

Consider the celebrated case of *Johnson v M’Intosh*.¹⁰⁴ This case is (in)famous for its discussion of the principle of discovery as the basis for acquisition of property rights in land. The principle of discovery, however, says nothing about how to determine the assets that may be acquired by discovery. Does the discoverer—or in this case, the conqueror—acquire rights only in the entire North American continent? In all the lands that were not yet possessed by another European power? In land stretching as far as the eye can see? Or only in land on which it set foot?¹⁰⁵

Naturally, the determination of the assets to be gained has important efficiency implications. The greater the territory, the greater is the holdout problem and the subsequent correction costs that concern Epstein. Inattention to the dimension of assets invariably changes the relative efficiency of alternative acquisition rules, and the analysis cannot proceed without reference to this aspect.

To illustrate, let us turn to the issue of water rights. In Colorado, the first appropriator of water obtains rights not only in the amount she actually puts to a beneficial use but also to a share in the common pool.¹⁰⁶ In Massachusetts, by contrast, the first appropriator does not acquire any particular rights in the pool.¹⁰⁷ Rather, if she is a riparian owner, she receives a right to a reasonable use of the pool subject to the like uses of other riparian owners. Neither rule corresponds to the classic first possession rule in which one owns all that one seizes. Simply focusing on the priority of the first actor does not help resolve how to define the scope of the property right obtained.

¹⁰⁴ 21 US 543 (1823). See also Eric Kades, *History and Interpretation of the Great Case of Johnson v. M’Intosh*, 19 L & Hist Rev 67, 69 (2001) (contending that the *M’Intosh* rule served as a cost-effective way for Europeans to expropriate Native American lands but that there was no real dispute in this case since the parties did not truly have conflicting claims to the land).

¹⁰⁵ For other discussions of the doctrine of discovery, see generally Alex Tallchief Skibine, *Chief Justice John Marshall and the Doctrine of Discovery: Friend or Foe to the Indians?*, 42 Tulsa L Rev 125 (2006).

¹⁰⁶ See, for example, *Coffin v Left Hand Ditch Co*, 6 Colo 443 (1882) (establishing the Colorado doctrine of first appropriation). For further discussion, see David B. Schorr, *Appropriation as Agrarianism: Distributive Justice in the Creation of Property Rights*, 32 Ecology L Q 3 (2005) (contending that the Colorado rule was intentionally designed to prevent control of water by capitalists and embodies an antimonopolistic, agrarian ideal).

¹⁰⁷ See, for example, *Stratton v Mt. Hermon Boys’ School*, 103 NE 87, 88 (Mass 1913) (denying an absolute right of property in water and stating that “[t]he use of the water flowing in a stream is common to all riparian owners and each must exercise this common right so as not essentially to interfere with an equally beneficial enjoyment of the common right by his fellow riparian owners”).

The different evolution of water rights in different states demonstrates why one must heed all three dimensions. When analyzed on one or two dimensions alone, acquisition rules may look very similar to one another. Once the dimension of assets is added to the mix, it becomes clear that ostensibly similar rules can lead to dramatically different results.

D. Nuisance

Nuisance law is designed to deal with the problem of externalities among property owners. It provides a cause of action for private nuisance whenever a property owner uses her land in a way that substantially (and unreasonably) interferes with the use and enjoyment of land by other owners.¹⁰⁸ Most modern theorists have analyzed the problem of nuisance by focusing on the dimension of dominion.¹⁰⁹ For example, Henry Smith pointed out that nuisance doctrine oscillates between an exclusion model and a governance (or management) model. In some instances—depending on the specific circumstances of the case—the law grants an aggrieved owner exclusion rights against the creator of the nuisance whereas in others the law seeks to reconcile the conflicting land uses of the parties by establishing more detailed and nuanced management rules.¹¹⁰

In a similar vein, Epstein noted that the design of nuisance doctrine reflects a balance of the twin forces that obstruct efficient allocation of resources: externalities and holdouts.¹¹¹ If the law grants property owners very weak protection against nuisance, there will be a serious externalities problem. If, on the other hand, the law gives very strong protection against nuisance, property owners will not be able to conduct high-value activities that impact neighboring lots without first negotiating permission from the affected neighbors. Under such a regime, a serious holdout problem will emerge. Nuisance doctrine is sensitive to both these concerns. It entitles aggrieved property owners to a remedy only when the interference with their use and enjoyment is substantial (as opposed to trifling).¹¹² Moreover, when the value of the activity giv-

¹⁰⁸ See W. Page Keeton, et al, *Prosser and Keeton on Torts* § 87 at 622–23 (West 5th ed 1984) (discussing the requirements for recovery on a private nuisance theory).

¹⁰⁹ See, for example, Richard R. Powell, 6 *The Law on Real Property* § 64.02[1]–[3] at 64–10 to 64–13 (Matthew Bender 2007) (Michael Allan Wolf, ed) (explaining nuisance law as setting restrictions on owners' power to use land in certain ways).

¹¹⁰ See Henry E. Smith, *Exclusion and Property Rules in the Law of Nuisance*, 90 *Va L Rev* 965, 974–75 (2004) (asserting that information costs can explain how regimes of exclusion and governance define entitlements in nuisance law).

¹¹¹ See Epstein, 36 *J L & Econ* at 557, 573 (cited in note 8).

¹¹² *Id.* at 575 (explaining that the law should not grant injunctive relief for every minor interference because of the massive holdout potential).

ing rise to the nuisance is very high, the remedy awarded to successful plaintiffs will typically be damages (as opposed to injunctive relief).¹¹³

Neither Smith nor Epstein fully explores the three dimensions of the nuisance problem. They both assume a single owner and seek to deal with the externalities problem by adjusting the owner's bundle of rights. However, in principle, the problem of nuisance could have been dealt with by adjusting asset size or asset characterization. For example, if all land were under single ownership there would be no need for nuisance law as no nuisances would ever arise. Thinking about the problem from an assets perspective suggests that one way to minimize external effects among neighbors would be to increase lot sizes or by changing asset configurations. Indeed, zoning law serves this purpose by restricting certain uses to certain areas. Among other things, zoning ordinances attempt to separate industrial uses from residential ones, designating each use category to a different area.¹¹⁴

Introducing the asset dimension to the analysis yields a very interesting insight about the socially optimal approach to nuisances. Epstein's article is an expansion of—and a tribute to—Ronald Coase's seminal article in which he established the connection between nuisance and transaction costs.¹¹⁵ Nuisance disputes are born out of two problems: externalities and transaction costs. The former problem gives rise to the dispute while the latter is the main obstacle to solving it privately through negotiations.

In principle, lawmakers could eliminate all nuisance disputes by fully specifying property rights that concentrate all ownership over every possible thing that may be affected in one person or by configuring assets in a way that would prevent all spillovers. For example, in a world in which all land were owned by a single owner, no nuisance disputes would ever arise. Such a solution, however, will come at an enormous cost to society. Configuring assets in a way that would prevent all nuisances would be devilishly expensive, and the cost of concentrating all land in a single owner would result in a dramatic loss of value.

¹¹³ See, for example, *Boomer v Atlantic Cement Co, Inc*, 257 NE2d 870, 873 (NY 1970) (granting an injunction to be vacated upon payment of permanent damages by the cement factory to neighboring landowners). See also Epstein, 36 J L & Econ at 576 (cited in note 8) (explaining that remedies are a function of the inverse relationship between externalities and holdouts and suggesting that a damage remedy is appropriate when the externality imposed on the plaintiff is much smaller than the holdout problem).

¹¹⁴ This goal lies at the very core of zoning. See *Village of Euclid v Ambler Realty Co*, 272 US 365, 390 (1926) (noting that the crux of recent zoning legislation was “the creation and maintenance of residential districts, from which business and trade of every sort, including hotels and apartment houses, are excluded”).

¹¹⁵ See Coase, 3 J L & Econ at 16 (cited in note 38).

Accordingly, it is better to adopt an approach to nuisance that seeks to achieve a compromise on all three dimensions, concentrating *most* rights over manageably small assets in the hands of a large number of distinct single owners. This implies a conscious acceptance of a certain level of nuisance in society. We agree to live with nuisances because we believe that the cost of resolving nuisance disputes, though real, are much lower than the cost of configuring assets in ways that internalize all externalities. The asset dimension offers a way to resolve nuisance suits, but it is not cost-effective.

E. Eminent Domain

The power of eminent domain allows the government to force property owners to transfer their title to the government in exchange for the payment of just compensation.¹¹⁶ The standard economic justification for this power is that without it land assembly effort will run aground due to holdouts. For example, Judge Posner refers to the holdouts as “[t]he only justification” for the power of eminent domain.¹¹⁷ Current theorizing, therefore, conceives of eminent domain as a solution to a problem of too many owners, each of whom wields the power to stop socially efficient projects. The power to take involuntarily allows the government to overcome holdouts and replace multiple owners of the necessary plots with a single owner—namely the government itself. This conceptualization of eminent domain is so entrenched in the minds of both scholars and students that it has blinded us to the possibility of alternative ways of thinking about the problem.

From a three-dimensional perspective, the underlying problem is not necessarily one of too many owners but rather of suboptimally configured assets. Assume that the government needs a large tract to construct a military base. The government would need to resort to land assembly only if there are not any individual tracts of adequate size. If there were sufficiently large tracts, fewer holdout problems would arise, and the government could acquire title to one or more of the tracts through voluntary negotiations.

The focus on asset size and configuration is not merely a theoretical nicety, leading to a different conceptualization of the problem. As we shall see later in the Article, it also offers an array of new ap-

¹¹⁶ See US Const, Amend V.

¹¹⁷ Richard A. Posner, *Foreword: A Political Court*, 119 Harv L Rev 32, 93 (2005) (referring to eminent domain as an “almost random form of taxation” that enriches the government at the expense of the private landowner and is only justified in a very narrow set of circumstances).

proaches to situations that have been thought to require transfer of title via eminent domain.¹¹⁸

III. THREE-DIMENSIONAL STRATEGIES

Having demonstrated the importance of three-dimensionality to property, we now turn to the specific strategies employed by lawmakers in light of that three-dimensionality. In order to maximize the value of property rights across society, lawmakers have to maximize their value as a function of three variables that do not always move in the same direction—owner, asset, and dominion.

The framework developed in this Article makes it possible to divide property doctrine into six distinct categories intended to reconcile the inherent tension that exists among the three dimensions. It is important to emphasize at the outset that we do not argue that these strategies were consciously devised by lawmakers. In other words, we do not offer in this Part a theory of how property rights are developed in the political arena or an evolutionary account of property law.¹¹⁹ We merely seek to explain how property rules have been grouped in the past in response to three-dimensional challenges and, thereby, to advance a coherent view of property law that arises from our three-dimensional approach.

Furthermore, we do not argue that our proposed categorization is the only possible one or even that it covers the field of all possible strategies. We readily admit that competing conceptualizations of property doctrines are possible. Yet, until such competing conceptualizations are offered, we posit that our three-dimensional approach offers an important perspective on property law in its *entirety*.

In the remainder of this Part, we outline the six reconciliatory strategies and demonstrate how they have been used. We would like to emphasize at the outset that the six strategies are not mutually exclusive, and, indeed, in the proceeding discussion we will highlight areas of overlap. We posit that these strategies hold the key for understanding extant property law. Additionally, we submit that comprehending the interplay of the strategies and identifying their relative advantages unlocks the hidden potential for superior solutions to many of property's dilemmas. Finally, we suggest that a better understanding of these strategies and their three-dimensional motivations

¹¹⁸ See Part IV.D.

¹¹⁹ Compare generally Saul Levmore, *Two Stories about the Evolution of Property Rights*, 31 J Legal Stud 421 (2002) (advancing a theory that transaction costs and interest groups drove the movement of property from the commons to privatization and, in several instances, back again to a more open-access arrangement).

creates a starting point for more deliberate and targeted use of these strategies in the future, as well as possibly suggesting new and as yet undeveloped strategies.

A. Fictional Owners

The first strategy we discuss is lawmakers' recognition of a fictional owner in order to concentrate ownership in a single owner, even though many persons share actual ownership.

Often, a given property item's asset configuration is such that the asset is too large for a single owner to exercise absolute dominion. But it is advantageous to reconfigure the owner in order to reach a single owner, rather than reconfigure or divide the asset. The most obvious instance of a large asset is a big physical item, like a skyscraper. However, the asset need not be a single physical thing—indeed, many of the cases in which the law employs the strategy of a “fictional owner” involve compound assets that combine many physical items. For instance, the single largest asset may be a business, which comprises many discrete and smaller items, including intangible assets such as goodwill. For obvious reasons, however, managing the business as a whole, rather than separate management of the component items, may sometimes produce great social utility.¹²⁰

While corporations are the most outstanding (and widely used) form of fictional owner, property law abounds with examples outside the corporate context. Married couples are considered a single owner-

¹²⁰ Ronald Coase paved the way for the “make or pay” analysis—whether corporations should produce components or services internally, or purchase on the market. See generally R.H. Coase, *The Nature of the Firm*, 4 *Economica* 386 (1937) (theorizing that firms arise in order to economize on transaction costs because the higher the cost of transacting externally on the market, the greater the comparative advantage of producing a firm's needs internally). Since Coase's pathbreaking article, an extensive literature has developed. See generally, for example, Armen A. Alchian and Harold Demsetz, *Production, Information Costs, and Economic Organizations*, 62 *Am Econ Rev* 777 (1972) (exploring the team productive process and why it induces the contractual formation of the firm); Benjamin Klein, Robert G. Crawford, and Armen A. Alchian, *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 *J L & Econ* 297 (1978) (describing how the potential postcontractual extraction of high rents induces parties to integrate vertically rather than contract); Oliver E. Williamson, *Transaction-cost Economics: The Governance of Contractual Relations*, 22 *J L & Econ* 233 (1979) (using the three dimensions of frequency, investment idiosyncrasy, and uncertainty to characterize transaction costs and match them with appropriate governance structures); Oliver E. Williamson, *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting* (Free Press 1985) (describing the analytical framework of transaction cost economics and applying it to different contractual settings); Oliver Hart, *An Economist's Perspective on the Theory of the Firm*, 89 *Colum L Rev* 1757 (1989) (finding the transaction cost economics model of the firm unconvincing and advancing a property-rights approach in which firms are characterized by their nonhuman assets); Bengt Holmström and John Roberts, *The Boundaries of the Firm Revisited*, 12 *J Econ Perspectives* 73 (1998) (arguing for a broader view of the firm than has been provided by either transaction cost economics or property rights theory).

ship unit for some purposes,¹²¹ as are many other types of partnerships.¹²² Trusts have a separate legal personality that owns the assets in place of the beneficiaries.¹²³ By a like token, decedents' estates replace the deceased as "owner" of her property until final distribution of the assets and winding up of the estate.¹²⁴

In all these instances, recognition of a single fictional owner permits the fictional owner to manage the large asset as an individual, even though the fictional owner may itself be a compound person, such as a public corporation. From a property perspective, bestowing legal rights on corporations and other fictional owners places formal ownership of the corporate assets in the hands of the corporations, while giving individual shareholders only partial ownership of the corporation itself, rather than the assets.

This recognition of the corporation as a separate "personality," rather than a collection of individuals tied together through a network of contracts, preserves many of the most important benefits of property law. First, the fiction of a corporate person preserves the ability of a single individual (or small number of individuals) to dispose of good title to an asset, even while the controlling individual remains responsible to many others under related bodies of law.¹²⁵ This reduces transaction costs by permitting those dealing with the corporation to rely upon the decisions of the authorized individuals¹²⁶ without having to seek approval of all or most of the "real" owners (that is, shareholders). Effectively, corporate ownership strips each individual shareholder of her power to exclude and grants this power to the group of sharehold-

¹²¹ See, for example, the discussion of tenancies by the entirety in *Sawada v Endo*, 561 P2d 1291, 1295 (Hawaii 1977) (holding that the tenancy by the entirety is predicated upon the legal unity of husband and wife in single ownership and cannot be conveyed or reached by execution through either spouse alone).

¹²² See Robert W. Hillman, Allan W. Vestal, and Donald J. Weidner, *The Revised Uniform Partnership Act* § 201(a) at 79 (West 2006) ("A partnership is an entity distinct from its partners.").

¹²³ See Henry Hansmann and Ugo Mattei, *The Functions of Trust Law: A Comparative Legal and Economic Analysis*, 73 NYU L Rev 434, 472 (1998).

¹²⁴ See generally, for example, *Joint Properties Owners, Inc v Deri*, 113 AD2d 691 (NY App Div 1986) (noting that the leasehold interest does not terminate upon the lessee's death but passes as personal property to the decedent's estate).

¹²⁵ For further discussion, see generally Nina A. Mendelson, *A Control-based Approach to Shareholder Liability for Corporate Torts*, 102 Colum L Rev 1203 (2002) (proposing to hold controlling shareholders liable for corporate torts and statutory violations based on their level of involvement).

¹²⁶ See generally Coase, 4 *Economica* 386 (cited in note 120); Williamson, 22 J L & Econ 233 (cited in note 120); Eugene F. Fama and Michael C. Jensen, *Separation of Ownership and Control*, 26 J L & Econ 301 (1983) (arguing that the separation of decisionmaking and risk-bearing functions survives in large corporations because it can control agency problems and effectively use specific knowledge in decisionmaking).

ers as a whole, through various voting mechanisms.¹²⁷ A prospective buyer of a corporately owned parcel of land can obtain the same title as she would in purchasing the land from an ordinary private owner simply by contracting with a duly authorized corporate agent without worrying herself with any of the formalities of the internal corporate decisionmaking process.

Second, the fiction discourages configuration of assets into sub-optimally small sizes and instead creates a mechanism for preserving assets at their optimal size. Where individuals cannot aggregate owner shares into larger fictional owners, they often find that an asset, as ordinarily configured, is too large for their purposes. This may be for the mundane reason that the asset is so valuable that it takes up too much of the owner's asset portfolio and blocks diversification of asset risk.¹²⁸ Or, it may be because the asset itself is of such a physical size that it cannot cost-effectively be used by a single individual. Without the option of preserving the larger asset configuration through the ownership of a "larger" fictional owner, individual owners might frequently find that they enhance their own utility by destroying asset value, causing an unfortunate and unnecessary loss of utility to society.¹²⁹

The fictional owner strategy thereby preserves many of the advantages of property law in enhancing social utility derived from asset management by compromising along the owner axis in order to preserve optimal asset configuration. Further, by aggregating the owners into a fictional unity, property law minimizes the dissipation of utility caused by splitting assets among too many owners.

B. Fictional Assets

Another strategy the law employs is the creation of fictional assets. The "reification" of property rights in Anglo-American law has often been dismissed as an excessively formalistic device or even a philosophical error.¹³⁰ Yet the strategy of fictional assets offers a solu-

¹²⁷ See Zohar Goshen, *Controlling Strategic Voting: Property Rule or Liability Rule?*, 70 S Cal L Rev 741, 743 (1997) ("Although an investor's decision to join an investors' group is made on an individual basis . . . from that moment onward . . . most decisions must be made collectively.").

¹²⁸ See Henry Hansmann and Reinier Kraakman, *Organizational Law as Asset Partitioning*, 44 Eur Econ Rev 807-17 (2000) (discussing the importance of organizational law in permitting a better match of asset packages for different tastes and desires for risk).

¹²⁹ For a fascinating exploration of situations in which an owner will find it cost effective to destroy asset value to maximize owner utility, see generally Allen, 31 J Legal Stud 339 (cited in note 53).

¹³⁰ See, for example, Douglas Litowitz, *Reification in Law and Legal Theory*, 9 S Cal Interdiscipl L J 401, 401 (2000) ("As applied to law, reification represents a kind of infection . . . because it is essentially an error, a delusion, and a mystification that blinds people to alternative legal arrangements by 'naturalizing' the existing legal system as inevitable.").

tion to two distinct problems. First, by permitting the recognition of property rights in fictional assets, property law extends its scope to intangible and abstract items of value like ideas and expressions. Second, by permitting ownership of abstractions, the fictional asset strategy permits dividing ownership of large physical objects among several owners while still minimizing transaction costs. In each case, the fictional asset permits adherence to the ideal package of ownership, asset, and dominion by configuring the asset into a form amenable to the standard property package.

Let us examine each of these two advantages in turn.

The most obvious instance of ownership of abstract assets can be found in the law of intellectual property. Intellectual property law recognizes and protects rights in intangible informational assets. The defining characteristic of intellectual goods is their lack of physicality.¹³¹ While many intellectual goods need a physical embodiment for marketing purposes, it is the informational content—and not the physical embodiment—that is the subject of intellectual property protection. Due to their intangible nature, intellectual assets do not have clear boundaries. Indeed, defining the boundaries of intellectual assets is one of the most difficult challenges lawmakers must confront.¹³² Yet, without legal protection, much of the value inherent in intellectual goods would be lost.¹³³ Because the initial production of intellectual goods often necessitates considerable investment and once produced they can be copied at a very low cost, there is a serious risk that not enough intellectual goods would be created without legal protection. Hence, the recognition of fictional assets, in this context, is deemed necessary to ensure adequate production of certain types of informational content.¹³⁴

Even for physical objects, the fictional asset strategy is pervasive and important. By permitting owners to slice up a physical “thing” into slices small enough to be amenable to full dominion by a single owner, the law maintains single owners with relatively uncompromised dominion (subject only to the rules of waste) over full and separate—albeit fictional—assets, instead of having to acknowledge multiple owners over the same asset. While property law concerns “things”

¹³¹ See Dan L. Burk, *Transborder Intellectual Property Issues on the Electronic Frontier*, 6 Stan L & Policy Rev 9, 9–10 (1994) (explaining that “[u]nlike physical goods, intellectual goods lack the barriers that would allow their investors to prevent their free appropriation by consumers”).

¹³² See, for example, Oren Bar-Gill and Gideon Parchomovsky, *A Marketplace for Ideas?*, 84 Tex L Rev 395, 429–30 (2005) (discussing the difficulties involved in defining the boundaries of ideas and inventions).

¹³³ See Burk, 6 Stan L & Policy Rev at 9 (cited in note 131).

¹³⁴ See, for example, Jonathan M. Barnett, *Cultivating the Genetic Commons: Imperfect Patent Protection and the Network Model of Innovation*, 37 San Diego L Rev 987, 991 (2000).

and therefore naturally gravitates toward recognizing ownership in physical items, the law also readily recognizes ownership in abstractions. Indeed, the reification of property rights in Anglo-American law, beginning in the Middle Ages, resulted in viewing all ownership interests in property as attached not to physical items at all, but rather to abstract estates that denote packages of rights regarding those items.¹³⁵ Under the estate system, an owner of real property never owns the underlying realty, but rather an estate in the realty.¹³⁶ If Sarah owns Blackacre, the estate system dictates that she does not own the land itself, but rather a fee simple absolute estate in Blackacre.

The estate system creates valuable distinctions that improve the ability to manage assets. The central feature of the estate system is its division of ownership along a temporal axis. Estates are divided between present and future interests; both kinds of estates are real interests that may currently be transferred and otherwise dealt with, but only the present interests contain a present right of possession.¹³⁷ Future interests contain only a future right of possession. Since the life of most assets in realty is much longer than that of human beings, the estate system made it possible to slice up the life of assets into smaller time periods and make a single person the owner of each discrete smaller (albeit abstract) asset. Thus, Jonathan, with a life estate in Blackacre, would own a real asset in a size that he could use during his lifetime, while leaving to Keith (the remainderman), an asset that Jonathan would manage less well. Yet, because each estate is a distinct asset, many of the advantages of the Blackstonian property ideal—such as easy alienability—are maintained.

This strategy is exemplified in the case of *Gruen v Gruen*.¹³⁸ There a father wished to give his son a painting by Gustav Klimt as a twentieth birthday gift but continue to retain possession of the painting during his own life.¹³⁹ In this case, the existence of a fictional asset—the vested remainder—enabled the father both to enjoy the painting during his life and to give his son a gift of that part of the value of the painting that the father could not enjoy. If fictional assets did not exist, the father could attempt to achieve the same result by bequeathing

¹³⁵ Jesse Dukeminier, et al, *Property* 175–82 (Aspen 6th ed 2006) (discussing the evolution of the estates system, which arose out of feudalism and defined estates according to their length of endurance).

¹³⁶ *Id* at 182 (“The development of the fee simple estate is an example of that most striking phenomenon of English land law, the reification of abstractions, a process of thinking that still pervades our law.”). While the estate system originally applied only to land, it was subsequently extended to other tangible and intangible assets.

¹³⁷ *Id* at 181–82, 186–90, 225–28.

¹³⁸ 496 NE2d 869 (NY 1986).

¹³⁹ See *id* at 871.

the painting to his son in his will. Doing so, however, would have entailed two distinct costs. First, it would have diminished the enjoyment of the gift-giver. In *Gruen*, the date of the gift held emotional significance, as it was the son's twentieth birthday, not at the much later date of his father's death. Second, and more importantly, the recognition of future interests enhances the efficient management of assets. In permitting creation of a future interest, the law creates the possibility of a single owner who will obtain greater enjoyment and employ superior management strategies. In *Gruen*, for example, the father wanted little from the painting after his life other than to be sure that his son would enjoy its value. Once in possession of the future interest, the son could sell it, mortgage it, diversify his investment holdings around it, and otherwise deploy it to its greatest advantage, all without disturbing the father's enjoyment of possession.¹⁴⁰

It is worth noting that a fictional asset strategy may be available alongside other strategies, such as that of a fictional owner. For instance, in *Gruen*, the father could have made himself a trustee for his son and transferred ownership of the painting to the new trust (a fictional owner). This strategy would have permitted the father to enjoy the psychological benefit of the timely gift, though it might have compromised some of the transferability of the son's interest.¹⁴¹

C. Forced Aggregation or Disaggregation

The third strategy—forced aggregation and disaggregation—can be applied both to physical assets (as exemplified by the doctrines of partition by sale and, most notably, takings by eminent domain) or to fictional assets (as illustrated by the doctrines of disentailing and the Rule against Perpetuities). This strategy aims at situations where the owner is unable to extract the full social value inherent in property ownership and is therefore likely to maintain the asset in a suboptimal configuration. The doctrines seek to force the property into the optimal asset configuration without compromising the drive toward a single owner, while minimizing the negative impact on owner dominion.

Rules permitting disentailing provide the most obvious, albeit somewhat obscure, example of this strategy. Fees tail are estates entailing a present right of possession that continues through the direct blood line. Created by a grant to *X* and “the heirs of his body,” the fee

¹⁴⁰ The father's desire to avoid testamentary disposition was apparently influenced by his desire to lower estate tax exposure. See *id.*

¹⁴¹ A trust would have created a fiduciary duty in the father toward his son regarding the painting; this would be somewhat more exacting than the duty not to commit waste that was created by the actual transfer of the future interest.

tail traditionally transferred possession from generation to generation of *X*'s descendants in what was essentially a series of life estates.¹⁴² Grantors would presumably create this estate in order to enhance the prestige of their families by forcing future generations to retain the ancestral land, or because the grantors did not trust that future generations would be as prudent in managing the land as the grantor.¹⁴³ Nonetheless, indulging the grantor's desires completely would come at too great a price to asset value. In our terms, the utility enjoyed by the grantor was outweighed by the disutility to future generations burdened by a poorly configured asset that could not be easily transferred. In response to this problem, lawyers and courts developed the "common recovery," allowing future generations to disentail the fee and return it to a fee simple.¹⁴⁴ Ultimately, most jurisdictions abolished the fee tail, forcing the aggregation of existing fee tails and their attendant future interests into fees simple absolute.¹⁴⁵

Legal control of aggregation and disaggregation is often necessary for assets that are durable and large. The durability ensures that the property will likely last over several lifetimes, preventing any one owner from enjoying its full value. As a consequence of her limited ability to extract utility from the property, the owner's incentives will not necessarily align with the interests of maximum asset value, and she may initiate various property configurations that seriously diminish asset value, as in the case of the fee tail.

Other times, rules of aggregation and disaggregation provide a response to changes in external circumstances that affect the optimal use of assets. For instance, over time, the ideal use of a certain area may change from farming to railroad to shopping mall. The optimal parcel size for each of these uses is obviously different. Yet, voluntary aggregation of assets into the new configuration may be hampered by high transaction costs, and in particular by strategic barriers. The state's power of eminent domain aims at resolving some of these

¹⁴² The fee tail was originally codified in the Statute de Donis Conditionalibus, 13 Edw I, stat I (1285). In England, the successive life estates interpretation of the estate competed with several other conceptions, such as viewing only the first generation or the first three generations as equivalent to life estates. See John F. Hart, "A Less Proportion of Idle Proprietors": *Madison, Property Rights, and the Abolition of Fee Tail*, 58 Wash & Lee L Rev 167, 172 (2001).

¹⁴³ The fee tail could also be useful as a tax-saving device by avoiding estate taxes. See Dukeminier, et al, *Property* at 187 (cited in note 135) (noting that the fee tail, though passing from generation to generation, did not expire until the original tenant in fee tail and all of that tenant's descendants were dead).

¹⁴⁴ See *id* at 187-88 (describing common recovery as an expensive legal procedure used to restore alienability of the land). See also Jesse Dukeminier and James E. Krier, *The Rise of the Perpetual Trust*, 50 UCLA L Rev 1303, 1320 (2003) ("Later, the common recovery was abolished, and a tenant in tail was permitted to convey a fee simple by a deed.").

¹⁴⁵ See Dukeminier, et al, *Property* at 188 (cited in note 135).

problems by permitting the seizure of a number of parcels despite the objections of holdouts and reconfiguring them into a new mix of parcel sizes and uses.¹⁴⁶

The example of takings most clearly demonstrates the importance of analyzing all the property dimensions at once. It is only the eclipse of the old combinations of single owner and asset that raises the need to create a new set of single-owner assets through forced transfers. Interestingly, the change in the ideal asset size or configuration may warrant a transition to smaller, rather than larger, parcel sizes. Such was the case in *Hawaii Housing Authority v Midkiff*,¹⁴⁷ where legislation employed the power of eminent domain to force owners to sell fee simple interests to their tenants in order to combat the problem of oligopoly created by excessively concentrated land ownership in Hawaii.¹⁴⁸

D. Limits on Owner-initiated Reconfiguration or Size

A related strategy employed by the law relies not upon the state's direct aggregation or disaggregation of property, but, rather, its placing restrictions on the freedom of owners to alter the asset configurations. Such restrictions may be effected either directly, for example, by zoning rules, or indirectly, through enforcement of nuisance suits or covenants in common-interest communities. In both cases, the goal of these restrictions is to preserve certain asset features that maximize the overall value of the affected assets. Private ordering through contracts maximizes the welfare of the contracting parties but may do so at the expense of third parties who derive value from the asset. As in the case of single owners configuring assets suboptimally, this is due to asset value that cannot be captured by the contracting parties due to physical limitations or high transaction costs.

For example, absent regulation or other legal restriction, property owners may choose to build a skyscraper on top of a historic landmark¹⁴⁹ without taking full account of the value of the asset as a landmark. Some of the landmark value is long-lasting and will be enjoyed only by future generations that cannot compensate the owner for pre-

¹⁴⁶ For a discussion of the role of eminent domain in countering strategic behavior, see Posner, 119 Harv L Rev at 93–94 (cited in note 117).

¹⁴⁷ 467 US 229 (1984) (upholding the constitutionality of the Land Reform Act of 1967, Haw Rev Stat § 516, which authorized the Hawaii Housing Authority to use eminent domain as a tool to achieve market dilution).

¹⁴⁸ See *id.* at 233 (“[T]he Hawaii Legislature enacted the Land Reform Act of 1967 . . . which created a mechanism for condemning residential tracts and for transferring ownership of the condemned fees simple to existing lessees.”).

¹⁴⁹ See generally *Penn Central Transportation Co v City of New York*, 438 US 104 (1978).

servation.¹⁵⁰ In addition, some of the asset value is dispersed among the public at large, as it is available to passersby or even those who simply derive satisfaction from the landmark's continued existence.¹⁵¹ Landmark protection legislation, which may take many forms including prohibitory regulatory zoning and incentive-based tax schemes,¹⁵² aims to prevent physical alteration to assets that harm overall asset value.

Other zoning regulations prevent physical alterations not for protection of asset utility enjoyed by future generations but rather to allocate asset configurations among existing owners. Ideally, such regulations serve as a means of reducing negative externalities produced by suboptimal asset use at a lower cost than owner-by-owner negotiations. For example, zoning may require a certain amount of green space to surround housing (through setback and minimum lot size rules).¹⁵³ In all these cases, the zoning rule prohibits a particular action that may enhance an owner's extraction of utility from the asset at a particular time but presumably would come at the expense of other owners' utility from their nearby land.

While one cannot deny that zoning can become the arena of rent-seeking decisionmakers,¹⁵⁴ the popularity of zoning even where mobility is high—as well as the voluntary creation of even more restrictive zoning-like rules in planned developments—suggests that in many situations zoning enhances asset value.

Regulation of asset characteristics is ubiquitous and by no means limited to realty. Virtually all assets, from cars to bank accounts, are subject to some form of regulation, restricting the owners' ability to reconfigure them. Even fictional assets, such as copyrights, are subject to some restrictions on reconfiguration. Copyright owners must respect the moral rights of creators and refrain from changing expressive works. The purpose of this restriction is to protect the reputation of artists and

¹⁵⁰ See generally John Nivala, *The Future for Our Past: Preserving Landmark Preservation*, 5 NYU *Envir L J* 83, 113 (1996) (noting that the only compensation the landowner receives for bearing the cost of preserving tomorrow's heritage is "the advantage of living and doing business in a civilized community").

¹⁵¹ See, for example, William A. Fischel, *Lead Us Not into Penn Station: Takings, Historic Preservation, and Rent Control*, 6 Fordham *Envir L J* 749, 753 (1995) (stating that even an isolated landmark is "a building that provides something that almost all of us would characterize as a public benefit").

¹⁵² For a discussion of preservation laws, see generally Carol M. Rose, *Preservation and Community: New Directions in the Law of Historic Preservation*, 33 *Stan L Rev* 473 (1981) (outlining the evolving rationale for modern preservation laws and showing how preservation law has also become a vehicle for community organization and politics).

¹⁵³ See Kenneth H. Young, 2 *Anderson's American Law of Zoning* § 11:01 at 437 (Clark Boardman Callaghan 4th ed 1996) ("The common zoning regulation requires that the dwellings in a specific district be constructed on a lot of a minimum size, with minimum frontage and setback.").

¹⁵⁴ See generally William A. Fischel, *The Economics of Zoning Laws: A Property Rights Approach to American Land Use Controls* (Johns Hopkins 1985).

thereby the investment of other owners who might be adversely affected by alterations that are prejudicial to the artist's reputation.¹⁵⁵

Outside of the regulatory arena, a number of other property rules can be seen as barring owner-initiated configurations of assets that are suboptimal. For example, rules barring certain chronological disaggregations of assets, such as the Rule against Perpetuities,¹⁵⁶ the Rule in Shelley's Case,¹⁵⁷ and a number of other obscure rules,¹⁵⁸ prevent the creation of certain kinds of contingent future interests. Similarly, the elimination of the fee tail not only involved aggregating already-created assets but also prevented future owner-initiated creations of the estate.¹⁵⁹

The *numerus clausus* principle that underlies the law of property may be understood as embodying the same strategy. The principle limits the ability of private parties to create new property rights, reserving this power exclusively to the legislator. Merrill and Smith justified the principle on the grounds that it economizes on the information costs of third parties.¹⁶⁰ Given that property rights avail against the rest of the world, if individual owners could create new property rights on a whim, it would force the rest of the world to investigate the nature of the specific arrangements or risk violating them. The *numerus clausus* rule primarily restricts the menu of available property rights¹⁶¹ and therefore mainly affects the dimension of owners' domain. Yet the rule also indirectly restricts owners' freedom to reconfigure their assets.

E. Transfer or Elimination of Elements of Dominion

Another strategy employed by policymakers to reconcile the three competing interests is to authorize the transfer of elements of dominion

¹⁵⁵ See generally Henry Hansmann and Marina Santilli, *Authors' and Artists' Moral Rights: A Comparative Legal and Economic Analysis*, 26 J Legal Stud 95 (1997) (arguing that the moral rights doctrine serves to provide economic benefits not just to the individual artist but also to owners of the artist's work and the public at large).

¹⁵⁶ The classic formulation of the rule is John Chipman Gray's: "No interest is good unless it must vest, if at all, not later than twenty-one years after some life in being at the creation of the interest." John C. Gray, *The Rule against Perpetuities* § 201 at 191 (Little, Brown 4th ed 1942).

¹⁵⁷ The Rule in Shelley's Case states "that if (1) one instrument (2) creates a life estate in land in A, and (3) purports to create a remainder in persons described as A's heirs (or the heirs of A's body), and (4) the life estate and remainder are both legal or both equitable, the remainder becomes a remainder in fee simple (or fee tail) in A." Dukeminier, et al, *Property* at 243 (cited in note 135).

¹⁵⁸ Other rules include the rule of the destructibility of contingent remainders and the doctrine of worthier title. See *id* at 241–44.

¹⁵⁹ See notes 142–46 and accompanying text.

¹⁶⁰ See Merrill and Smith, 110 Yale L J at 8 (cited in note 71) ("The existence of unusual property rights increases the cost of processing information about all property rights. . . . Standardization of property rights reduces these measurement costs.")

¹⁶¹ See *id* at 40 (describing how *numerus clausus*, though strongly restrictive, is also permissive and therefore tends toward the optimal level of standardization).

to others or, in extreme cases, to transfer directly or eliminate dominion elements altogether. This strategy limits property rights by limiting the dominion of the owner without forcing the addition of others to the ownership structure and without reducing the scope of the owned asset. As such, the strategy necessarily compromises the Blackstonian ideal, but it does so in order to preserve interests not protected by the ordinary structure of property law.

This strategy often comes into play where assets consistently produce significant positive externalities making them valuable to others, while dispersing the benefits so as to preclude cost-effective bargaining between the owners and individual beneficiaries of the positive externalities. The strategy seeks to preserve the positive externalities for others over time by creating tools that lock in value for beneficiaries despite possible changes in ownership.

Interestingly, the strategy is most valuable at opposite extremes of benefit dispersal. Where there is only a single beneficiary, individualized bargaining might be foiled by strategic difficulties seen in a bilateral monopoly.¹⁶² Conversely, where the beneficiary is a large and dispersed public, bargaining may be precluded by the fact that no individual beneficiary enjoys enough benefit to warrant transacting with the owner. Either way, the strategy offers a way to anchor such bargains as may be struck into property interests that bind successors in interest.

Transfer of elements of an owner's dominion to others is often carried out via formalization of various nonpossessory interests in assets. A familiar example is the formalization of conservation easements. Jurisdictions that recognize conservation easements permit landowners to grant third parties, typically an environmental organization, a nonpossessory interest in the land in exchange for some tax benefits.¹⁶³ The mechanism of conservation easements is designed to permit beneficiaries to bar socially undesirable uses of private land. By granting the easement, the owner restricts her dominion over her property, committing not to harm certain socially valuable characteristics of the property. The recipient of the easement has no possessory rights and instead takes only a right to a particular use of the land and

¹⁶² See generally Ian M. Dobbs and Martyn B. Hill, *Pricing Solutions to the Bilateral Monopoly Problem under Uncertainty*, 60 S Econ J 479 (1993) (deriving a nonuniform price solution to the bilateral monopoly problem in response to the suboptimal performance of uniform pricing).

¹⁶³ See generally Todd D. Mayo, *A Holistic Examination of the Law of Conservation Easements*, in Julie A. Gustanski and Roderick H. Squires, eds, *Protecting the Land: Conservation Easements Past, Present, and Future* 26 (Island 2000) (presenting a comparative analysis of the basic elements of conservation easements among different states).

the right to bar the owner's interference therewith.¹⁶⁴ Importantly, because the easement is a property right and not merely a contractual arrangement, it continues with the land and does not have to be rebargained with every new owner.

The conveyance of elements of an owner's dominion to others is also a viable means of preempting negative externalities. Indeed, all servitudes—easements, covenants, equitable servitudes, profits, and others—are understood in this light.¹⁶⁵ Covenants, for example, are binding agreements founded in a property relationship that “run with the land” instead of dissipating with the departure of the original covenants.¹⁶⁶ Covenants do not create new titleholders or owners of any of the concerned assets. Rather, they impose small restrictions on owner dominion in order to bestow nonpossessory rights on the covenantee.

Sometimes, lawmakers deem it necessary to go beyond authorizing the transfer of elements of dominion to directly regulating or eliminating certain dominion elements. This result is achieved by regulation or operation of law rather than by private bargain. Regulatory restrictions on owners' dominion can be seen in use restrictions in zoning ordinances as well as various environmental and conservation laws. Zoning regulations may prevent some owner uses such as the opening of gas stations in residential developments¹⁶⁷ or the operation of industrial plants too close to neighboring homes.¹⁶⁸ Statutes like the Clean Air Act,¹⁶⁹ the Clean Water Act,¹⁷⁰ and the Endangered Species Act¹⁷¹ prevent, among other things, property owners from performing certain acts on their property that pollute or endanger certain animal and plant species, and similarly inhabit the boundary between the two strategies.

The law of waste—as applied between concurrent owners—is another example. Essentially, the doctrine grants the owner out of possession the power to prevent certain uses of the asset that may be

¹⁶⁴ See *id.* at 27 (noting that the definition of a conservation easement varies across states and is defined by states who have adopted the Uniform Conservation Easement Act as a “non-possessory interest . . . in real property”).

¹⁶⁵ See Dukeminier, et al, *Property* at 667–71 (cited in note 135).

¹⁶⁶ *Id.* at 740–44.

¹⁶⁷ See generally, for example, *Sanborn v McLean*, 206 NW 496 (Mich 1925) (enjoining the building of a gas station on land subject to a longstanding reciprocal negative easement prohibiting non-residential buildings).

¹⁶⁸ See generally, for example, *Boomer v Atlantic Cement Co, Inc.*, 257 NE2d 870, 873 (NY 1970).

¹⁶⁹ Air Pollution Prevention and Control Act (“Clean Air Act”), Pub L No 91-604, 84 Stat 1676 (1970), codified as amended at 42 USC § 7401 et seq (2000).

¹⁷⁰ Federal Water Pollution Prevention and Control Act (“Clean Water Act”), Pub L No 92-500, 86 Stat 816 (1972), codified as amended at 33 USC § 1251 et seq (2000 & Supp 2004).

¹⁷¹ Endangered Species Act of 1973, Pub L No 93-205, 87 Stat 884, codified as amended at 16 USC § 1531 et seq (2000).

deleterious to her interest.¹⁷² The law of waste effectively forces the owner in possession to take account of other concurrent owners' interests and refrain from acting in ways that maximize her payoffs at the expense of theirs. Without the law of waste, concurrent owners would likely be forced to maintain a physical presence on the property in order to monitor each other's uses. Hence, the formalization of the law of waste makes it possible to use land more efficiently by entrusting possession to single owners and lowering monitoring costs for owners out of possession.

F. Differential Acquisition Rules

A final strategy polices the degree and timing of privatization of assets. Thus, some resources are subject to a rule of capture, encouraging rapid assimilation into the domain of private property, while others are subject to rules such as reasonable use or public trust that prevent full transition to private property.

The rule of capture awards ownership of physical objects to the first person to reduce the items to possession.¹⁷³ The classic form of the rule is found in *Pierson v Post*,¹⁷⁴ which resolved a dispute between two hunters who claimed the same fox. The court ruled that foxes, as wild animals, were subject to seizure and the establishment of private property rights upon capture, and that foxes hunted on public lands were captured and transformed into private property upon "occupation," that is, physical seizure of the animals.¹⁷⁵ The rule of capture has been applied in a number of other situations in which courts sought to establish how private property rights are established in "fugitive resources."¹⁷⁶ In addition, property law contains many parallels to the rule of capture in which ownership goes to the first person to seize the asset and reduce it to possession. For example, the rule of discovery in

¹⁷² See generally Jedediah Purdy, *The American Transformation of Waste Doctrine: A Pluralist Interpretation*, 91 Cornell L Rev 653, 658 (2006).

¹⁷³ See the discussion in Smith, 90 Va L Rev at 1030–32 (cited in note 110).

¹⁷⁴ 3 Cai R 175 (NY Sup Ct 1805).

¹⁷⁵ See *id* at 175.

¹⁷⁶ See the discussion in Dean Lueck, *The Rule of First Possession and the Design of the Law*, 38 J L & Econ 393, 422–30 (1995):

First possession rules are the dominant method of initially establishing property rights. Such rules grant a legitimate ownership claim to the party that gains control before other potential claimants. They have been applied widely in both common and statute law, in such varied settings as abandoned property, adverse possession, bona fide purchasing, the electromagnetic spectrum, emissions rights, fisheries and wildlife, groundwater, hardrock minerals, intellectual property, oil and gas, land, nonbankruptcy debt collection, satellite orbits, spoils of war, treasure trove, and water rights.

land awards ownership to the first “discoverer” of unowned realty.¹⁷⁷ Similarly, the law awards ownership of abandoned property to the first person to take true possession of the item.¹⁷⁸

Yet, rules of capture are not universal. In many circumstances, the law prevents rapid assimilation of assets into private property, and instead limits the ability of potential owners to transform unowned assets into private property. For example, the various rules for establishing private property rights over unowned water generally forbid ownership to the first person to establish possession over any given waters. The English “natural flow” rule for surface waters forbids water appropriation by upstream riparian landowners in any way that impairs the water’s “natural flow” unless the appropriation enjoys the assent of all downstream owners.¹⁷⁹ The American “reasonable use” rule permits appropriation without such assent, but only to the extent of a reasonable riparian use for the upstream land.¹⁸⁰ A competing American rule—the “Colorado” rule or “prior appropriation” rule—privileges the first beneficial appropriation over other would-be appropriators;¹⁸¹ this rule too, while bearing some resemblance to first possession doctrines, ultimately leaves some waters outside the private property system.¹⁸²

First appropriation of water is problematic given the general geographic location and movement of water. Stable patterns of consumption would not be possible under a first appropriation rule, as no use would be entitled to legal protection until potential users reached contractual agreements with all potential rival claimants. Absent such agreements, only waters actually reduced to possession would be owned. As a result, high transaction costs would bar efficient investments. Why

¹⁷⁷ One infamous application of this rule can be found in *M'Intosh*, 21 US at 595–96, 604–05, which ruled that Native Americans did not have true ownership of lands in the Americas and that the European nations could therefore establish ownership through “discovery.”

¹⁷⁸ See, for example, *Eads v Brazelton*, 22 Ark 499, 499 (1861) (ruling that ownership over an abandoned shipwreck could be established by “occupation”—that is, actual salvage operations and not mere discovery of the wreck’s location—and that failure to reduce the wreck to possession defeated a claim of ownership).

¹⁷⁹ See T.E. Lauer, *The Common Law Background of the Riparian Doctrine*, 28 Mo L Rev 60, 101–02 (1963) (discussing the English case of *Wright v Howard*, 57 Eng Rep 76 (Ch 1823), which introduced the “natural flow” theory, affirming the principle that each proprietor has equal rights to water usage and therefore no proprietor can use her right to the prejudice of any other).

¹⁸⁰ See *Evans v Merriweather*, 4 Ill 492, 494 (1842) (“There may be, and there must be, of that which is common to all, a reasonable use. The true test of the principle and extent of the use is, whether it is to the injury of the other proprietors or not.”).

¹⁸¹ See, for example, *Coffin v Left Hand Ditch Co*, 6 Colo 443, 446 (1882).

¹⁸² A nonbeneficial use, for example, grants no appropriative rights; it is the style of appropriation rather than the actual capture that grants the rights. Thus, someone might draw from unclaimed waters but be forbidden to exercise property rights over them because they fall within the scope of the privileged appropriation.

invest in a water pump if only water actually pumped is protected and future upstream diversions cannot be prevented?

Additionally, excessively rapid assimilation of some natural resources could lead to a tragedy of the commons, involving overappropriation and wasteful use. This is due to the taker's ability to internalize the stream of benefits from a resource once it is reduced to property, while paying only the direct cost of appropriation and a miniscule share of the loss to society as a result of the resource being removed from the commons and closed to others' use. Only where transaction costs are sufficiently low (as in, for example, a small community with highly effective social norms) can the tragedy be avoided as every taker is forced or convinced (through side payments) to internalize a greater share of the societal cost.¹⁸³

Holding natural resources like water outside the ordinary appropriation rules keeps the Blackstonian property system away from a resource to which it is ill-suited but does so without changing the Blackstonian nature of property. Thus, once water is appropriated, under whatever rule, it is owned under precisely the same rule as any other property. This keeps water (once divided under special rules of appropriation) within standard asset-owner-dominion configurations. At the same time, the appropriation rules encourage appropriate investments and discourage tragedies of the commons.

Other natural resources have also been placed outside the ordinary capture rule. While oil and gas have been viewed as "fugitive resources" and therefore logically analogous to wild animals subject to the capture rule, many states have adopted a different course. Modern rules prevent free and unlimited appropriation, and instead force potential claimants into common pools or restrict them to variations of reasonable use.¹⁸⁴ Arrangements of the latter type serve, like water rules, to preserve standard Blackstonian property configurations for the resource once it is appropriated, but slow appropriation to take account of the size of the pool and the associated difficulties with free appropriation.

Use of differential appropriation rules allows policymakers to distinguish between asset characteristics that are not a good fit for private property rights subject to other nonprivate property regimes, while retaining some degree of property treatment where appropriate.

¹⁸³ See generally Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge 1990) (criticizing assumptions underlying proposed solutions to the tragedy of the commons and exploring an alternative solution in which users self-organize and govern themselves in the long-term management of the common resources).

¹⁸⁴ See generally Howard R. Williams, *Conservation of Oil and Gas*, 65 Harv L Rev 1155 (1952) (discussing regulatory efforts in the oil and gas industry to prevent waste and improve recovery through prorationing, well-spacing, or compulsory pooling and unitization).

Asset characteristics that do not fit well with private property rights may be subjected to other nonprivate property regimes. Property treatment may be retained, nonetheless, where appropriate for other asset characteristics. Rather than forcing all assets into the Blackstonian mold of a single owner, this strategy keeps certain assets out of the private property system and under common or public ownership until it makes economic sense to introduce private property rights in them or in certain aspects of them.

IV. THREE-DIMENSIONAL SOLUTIONS FOR PROPERTY PROBLEMS

In this Part, we present some normative implications of our three-dimensional property analysis. Specifically, we show how many property dilemmas that have traditionally been resolved by one of the six strategies we outlined in the previous Part are actually amenable to resolution by more than one strategy. In addition, we show that some dilemmas not previously considered as amenable to resolution may be resolved by use of one or more of the six strategies. Finally, we look at some problems that have been created in defining property rights without due heed to a three-dimensional analysis and show how they may be resolved by using one or more of our six strategies.

A. Tribal Land

As discussed earlier, anticommons—excessive fragmentation of ownership shares among owners—characteristically plague some property forms.¹⁸⁵ One of the most prominent examples of an anticommons is provided by the land regime in Native American reservations. In a well-intentioned but misguided attempt to protect communal Native American lands in the late nineteenth century, Congress provided for the allocation of reservation lands among Native American households, with provisos severely limiting alienation of the parcels.¹⁸⁶ Over the years, the lands became ever more divided among heirs and the parcels became increasingly fragmented to the point where some land interests produced a lease income of as little as a tiny fraction of one cent per month and much of the land lay fallow.¹⁸⁷ In 1983, Congress

¹⁸⁵ See Part II.A.

¹⁸⁶ See General Allotment Act, ch 119, 24 Stat 388 (1887), codified in various sections of title 25, repealed by the Indian Land Consolidation Act Amendments of 2000 § 106(a), Pub L No 106-462, 114 Stat 2007, codified in various sections of title 25. See also Act of March 2, 1889, ch 405, 25 Stat 888 (authorizing the division of the Great Reservation of the Sioux Nation into separate reservations and the allotment of specific tracts of reservation land to individual Indians, conditioned on the consent of three-fourths of the adult male Sioux).

¹⁸⁷ *Hodel v Irving*, 481 US 704, 708 (1987) (quoting legislative history on the Indian Reorganization Act of 1934).

passed the Indian Land Consolidation Act, which escheated small portions of highly fractionated parcels to the tribe upon death of the owner. However, in *Hodel v Irving*,¹⁸⁸ the Supreme Court ruled that the escheat worked an unconstitutional uncompensated taking.¹⁸⁹ As Heller noted in criticizing the case, the result was that many Native American lands remained in an anticommons.¹⁹⁰

A three-dimensional analysis highlights the possibility of other strategies for combating anticommons. Reducing the number of owners by eliminating the interests of holders of small portions of highly fractional parcels is not the only possible solution to the challenge of excessive fragmentation, nor is it necessarily the best one. Indeed, even after eliminating the claims of the smallest interest holders, the land would remain divided among multiple owners (albeit with somewhat greater interests). Hence, while clearing title of the smallest owners' claims would likely prevent further deterioration into anticommons, it would not likely improve the alienability of the land or the cost of managing it to a significant extent.

Our approach highlights the possibility of adjustments along the owner or dominion axes and thereby brings to light several strategies that could outperform the solution of forced forfeiture. For instance, policymakers could address the problem of excessive fragmentation of interests in tribal land by appointing a single fictional owner in the land, such as a tribal cooperative, with tribal member-owners exchanging their undivided fractional interests in the land for shares in the cooperative. This solution respects all existing claims to the property while reducing the cost of managing the land. The owners would commute their veto powers for voting rights, and decisions about the use of the land would be made by the majority of the members.

Alternatively, policymakers might consider making the land freely alienable and use the strategy of formalizing limited nonpossessory tribal rights to protect traditional land uses. This approach would allow tribe members to transfer their land to nonmembers subject to a servitude that would run with the land and ensure that future owners do not use it in ways prejudicial to the tribal heritage. This would allow owners to escape the trap of passing along small, unusable shares by selling them to a buyer with a superior use. At the same time, the

¹⁸⁸ 481 US 704 (1987).

¹⁸⁹ See *id.* at 716–18. See also *Babbitt v Youpee*, 519 US 234, 244 (1997) (ruling that Congress's effort to rehabilitate the Act by allowing a narrow class of individuals to receive fractional interests did not cure the fatal flaw ruled unconstitutional in *Irving*).

¹⁹⁰ See Heller, 108 Yale L J at 1217 (cited in note 11) (attacking the *Hodel* and *Babbitt* decisions rejecting private antifragementation strategies as further perpetuating the tragedy of the anticommons).

nonpossessory interests retained by the tribe members would enable them to seek injunctive relief against future owners whose uses run afoul of tribal traditions.

B. Conservation Commons

The strategy of formalizing nonpossessory interests could improve the management of natural resources. A three-dimensional approach demonstrates the possibility of creating useful new tools for achieving conservation of parks and open space.

Parks generally do not fit well into private property regimes. Purely private parks are likely to be undersupplied as spillover benefits to neighbors are extensive and transaction costs are high. Thus, many areas that would be socially optimal for use as parks will be used in some other manner that provides a higher return for the private owner, even though the private use is inferior from a social welfare point of view.¹⁹¹ Ordinary commons management of parks and open spaces is also problematic. Turning parks into public commons raises the specter of overexploitation.¹⁹² Without effective governance and enforcement mechanisms, common property regimes make it possible for members of the owners' group to take full advantage of the resources without bearing the full cost of their actions.

Generally, the real world solution for the failings of common and private property in this context is found along the ownership axis. Specifically, authorities usually keep parks and open space under government ownership. Unfortunately, this solution raises a few problems of its own. First, government actors often mismanage conservation properties. Government actors are imperfect agents of the public will, and they may find it advantageous to trade away the benefits of their power for personal gain. Thus, for example, they may collaborate with private developers to dispose of government property at submarket prices and encourage inefficient development on conservation property.¹⁹³ Additionally, decisionmakers may fall prey to fiscal illusion that leads them to fail to take account of public benefits or costs that do

¹⁹¹ See Abraham Bell and Gideon Parchomovsky, *Of Property and Anti-property*, 102 Mich L Rev 1, 2 (2003) ("Government actors often mismanage conservation properties, collaborating with private developers to dispose of government property at submarket prices and encouraging inefficient development on conservation property.").

¹⁹² See Hardin, 162 Science at 1244 (cited in note 96).

¹⁹³ Bell and Parchomovsky, 102 Mich L Rev at 2 (cited in note 191). To give one example, the federal Bureau of Land Management came under fire in a recent congressional report for its sale of seventy acres of Nevada land to a private developer for \$763,000; the developer sold the land the next day for \$4.6 million. See Joel Brinkley, *A U.S. Agency Is Accused of Collusion in Land Deals*, NY Times A16 (Oct 12, 2002).

not appear directly in the government budget.¹⁹⁴ Together, these factors lead to a significant likelihood that conservation properties will be transferred to suboptimal development interests even when owned by the government.¹⁹⁵

A possible remedy to the problem of government mismanagement of conservation properties is to divide the asset or dominion, rather than selecting a different single owner. As we have suggested elsewhere, lawmakers could provide for formalized nonpossessory rights—specifically, negative easements—in neighboring property owners.¹⁹⁶ Formalizing the neighbors' interests into formal negative easements would introduce a new element into conservation of the threatened land: a network of antidevelopment rights.¹⁹⁷ The creation of a network of nonpossessory rights in neighboring property owners would not give them any special rights to use or possess conservation properties. Yet, it would give them veto power over the development of conservation properties, enabling them to seek legal remedy against development plans that did not get their blessing. Furthermore, the resulting network of negative easements in the hands of the neighbors could produce a regime in which it is practically impossible for unwanted development to threaten conservation of the defended property. Developers who wish to develop the land would need to secure consent from all easement holders in a process that is notoriously susceptible to holdout problems and strategic bargaining.

C. Access to Coastal Lands

Property rights in beaches present a particularly nettlesome problem in many states. Generally, state law preserves the wet sand area (the strip of sand demarcated by the ebb and the flow of the tides) as public property while recognizing private property rights in the dry sand area.¹⁹⁸ In many beaches, the general public cannot access the wet sands without crossing over private dry sands. States have resorted to various tactics in order to create or preserve access to the wet sands beaches. Courts in New Jersey invoked the public trust doctrine as grounds for creating easements by necessity over private beach proper-

¹⁹⁴ Bell and Parchomovsky, 102 Mich L Rev at 17 (cited in note 191).

¹⁹⁵ For examples, see id at 30–31 (listing four recent sales of undeveloped public lands in which conservation interests were systematically disadvantaged by the political decisionmaking process).

¹⁹⁶ See id at 31–37 (proposing an “antiproperty easement” that vests in each property owner the right to veto any development in nearby green space).

¹⁹⁷ Previously we have labeled those rights “antiproperty rights.” See id at 5.

¹⁹⁸ See Rose, 53 U Chi L Rev at 713 (cited in note 86). Some states, most notably California, have extended the rights of the public “from the tidelands to the dry sand areas landward of the high-tide mark.” Id at 713–14.

ties for the benefit of the public.¹⁹⁹ Specifically, the courts reasoned that the state's duty under the public trust doctrine to preserve public beach access implied the existence of public easements over private lands as necessary to ensure access. Courts in California and Texas chose to rely on theories of prescriptive easements or implied dedication to secure access and use rights for the public.²⁰⁰ Finally, courts in Oregon, Florida, and Hawaii turned to a theory of custom to reach the same result.²⁰¹

The various approaches taken by the courts have one thing in common: they all focus on the dominion dimension. In all cases, courts recognized public access rights by narrowing the exclusion rights of beachfront property owners. Specifically, the courts interpreted the bundle of rights of beachfront owners as not including the right to exclude members of the general public seeking to reach the beach.

A different solution to the problem of public access to beaches becomes apparent once the problem is analyzed along the asset dimension. An asset-oriented analysis suggests that the problem of public access to beaches arises due to a suboptimal configuration of beachfront properties. The decision to create contiguous strips of private parcels effectively blocked the public from reaching the beach without trespassing on private property. An optimal configuration of the wet sands beach asset would necessarily include a means of access. From an asset-oriented perspective, it becomes apparent that the challenge of access to beaches presents a natural case for forced reconfiguration.

A different configuration of private lots interspersed with government lots (or narrow government strips) could be a better solution to the problem. Initially, such a configuration could have been achieved if the government retained title in certain beachfront lots and granted the public a right of access across them. Today, such a configuration can be accomplished via government exercises of its eminent domain

¹⁹⁹ See generally, for example, *Matthews v Bay Head Improvement Association*, 471 A2d 355 (NJ 1984) (finding that the public must be given both access to and use of the foreshore as well as privately owned dry sand areas "as reasonably necessary").

²⁰⁰ See generally, for example, *Gion v City of Santa Cruz*, 465 P2d 50 (Cal 1970) (superceded by statute) (holding that an implied dedication of property rights to the public arose when the public has used the land for more than five years without permission or objection from previous owners); *Seaway Co v Attorney General of Texas*, 375 SW2d 923 (Tex Civ App 1964) (affirming the jury's finding of an implied dedication of land to public use and of an easement by prescription over land that had been continuously and adversely used for over ten years).

²⁰¹ See generally, for example, *Thornton v Hay*, 462 P2d 671 (Or 1969) (ruling that the public's use of the dry sand areas of the beach met all the elements of the custom doctrine: ancient, exercised without interruption, peaceable, reasonable, certain, obligatory, and not repugnant or inconsistent with any other law or custom); *City of Daytona Beach v Tona-Rama, Inc.*, 294 S2d 73 (Fla 1974) (subscribing to the customary rights doctrine but declining to find an easement by prescription because the public's use of the property was in furtherance of, not against, the interests of the private landowner); *County of Hawaii v Sotomura*, 517 P2d 57 (Hawaii 1973) (recognizing that the public's long-standing use of the beach had ripened to a customary right).

power. Although this solution would initially impose a cost on the government, as it would require compensating aggrieved property owners, it might represent a long-term improvement for all parties involved. Private property owners would fare better under the proposed solution because those property owners whose property will be taken would receive compensation. The public would benefit from clearer and more convenient access to the beach. The government may be better off in the long run because there might be fewer conflicts between owners of beachfront properties.

D. Land Assembly

Provision of infrastructure and public goods often requires the government to engage in land assembly. Whenever this need arises, there is a natural tendency to think about eminent domain. After all, it is the accepted lore among legal scholars that land assembly is the paradigmatic situation in which the government ought to exercise its takings power.²⁰² Consider, for example, a plan to run a railway through a mountain valley. Without eminent domain, a single holdout can stop the project. Eminent domain allows the government to get around the high transaction costs and holdouts inherent in this situation.

Our three-dimensional analysis expands on the conventional analysis in two important respects. First, it complements the conventional analysis by more precisely characterizing the assets that ought to be taken by eminent domain. Our contribution here is primarily descriptive; we summarize the purpose of some eminent domain doctrines and suggest how they may be best implemented. Second, our analysis challenges the conventional analysis by proposing alternative ways to carry out large-scale projects without resorting to eminent domain. We discuss these matters in order.

Many commentators have noted that the construction of railroads and highways by the government necessitates exercises of eminent domain. Little attention, if any, has been paid to the important question of how much of the involved assets the government should take. From the government standpoint, the answer is clear. Since the government must pay compensation for the value of the taken property, it has an incentive to take as little as possible. Thus, in order to minimize compensation payments, the government is likely to prefer to take an easement over taking title to part of the tract when possible.²⁰³ Likewise, when the

²⁰² See, for example, Posner, 119 Harv L Rev at 94 (cited in note 117) (discussing the need to assemble a large tract of land for the city's redevelopment plan as a possible impetus for the exercise of eminent domain in *Kelo v City of New London*, 545 US 469 (2005)).

²⁰³ See, for example, *Preseault v United States*, 100 F3d 1525, 1532 (Fed Cir 1996).

government decides to take title, it will be inclined to take title to part of a tract and not condemn the tract as a whole.²⁰⁴

While dominion-oriented perspectives may favor such a “minimalist” approach, as it represents the smallest possible incursion on the rights of owners, an asset-oriented perspective strongly militates against it. To illustrate, let us return to the railway example. In the nineteenth century, the government and private railroad companies acquired multiple easements over private properties in order to run railways through them. These were no ordinary easements. Rather, they were high-impact, durable easements that completely prevented the titleholder from using the part of her property burdened by the right-of-way.²⁰⁵ Effectively, the taking of the easement deprived the owner of virtually the entire value of the affected part. Such takings, in other words, had the same effect as title transfers of a slice of the parcel. However, by taking an easement rather than full title to the slice, such takings led to distorted configurations of both the title and the easement. As the years passed, the economics of the railroad business changed dramatically, leading to many lines becoming uneconomical. Yet, the existence of the easements encouraged the companies to maintain lines in suboptimal situations, as abandonment of the line would lead to abandonment of the realty. Only where the social loss exceeded substantial transaction costs would it be worthwhile for railroads to abandon the easement in exchange for an agreed-upon compensation.

Additionally, even if the government were to take title over a portion of the parcel, running a railway through the middle of a tract could, in some cases, render the remainder virtually valueless. Accordingly, in such cases, it is important for authorities to apply the strategy of forced aggregation and compel the government to take title to the whole lot. This suggestion is in marked contrast with the general practice of taking no more of an interest than narrowly necessary to accomplish the public purpose of the taking.²⁰⁶

The second point we wish to make is that land assembly does not necessarily call for the use of eminent domain. Indeed, several of the

²⁰⁴ Consider *Ink v City of Canton*, 212 NE2d 574, 579 (Ohio 1965).

²⁰⁵ Indeed, in *Preseault*, the government advanced the argument that “the general federal legislation providing for the Government’s control over interstate railroad operations as enacted and amended over the years had the effect of redefining the private property rights of these owners, leaving them without a compensable interest in the land.” 100 F3d at 1533.

²⁰⁶ See *Hill v Western Vermont Railroad Co.*, 32 Vt 68, 76 (1859):

In either mode of appropriating land for the purposes of the company, . . . there is this implied limitation upon the power [of eminent domain], that the company will take only so much land or estate therein as is necessary for their public purposes. It does not seem to us to make much difference in regard to either the quantity or the estate, whether the price is fixed by the commissioners or by the parties.

strategies we discuss in Part III can be used instead of takings. Assume, for example, that the government needs to assemble a sufficiently large parcel for a parking lot. The standard solution is to replace the multiple private owners of the relevant lots with a single government owner through the use of eminent domain. Importantly, the same result can be accomplished by alternative strategies as well. One such strategy is the creation of a fictional owner. For example, the government can force the relevant private owners to set up a corporation or a partnership and then transfer their lots to it in exchange for shares. A somewhat similar approach was taken by Michigan in the oil and gas industry. The Michigan Department of Environmental Quality adopted a procedure to mandate compulsory pooling “whenever an owner desires to develop his or her mineral rights, but cannot do so because the owner’s tract is smaller than the established drilling unit.”²⁰⁷ Amnon Lehari and Amir Licht proposed an interesting variation on this strategy in which land assembly for large-scale, for-profit development projects would be permitted only by means of a special-purpose development corporation, which would, in turn, have to offer condemnees the option of compensation in corporate shares instead of cash.²⁰⁸

As many commentators have noted, the strategy of imposing limitations on owners’ ability to reconfigure their assets can also lead to outcomes that are just as valuable as land assembly for some purposes. An industrial park, for example, can be created by zoning changes rather than by land assembly through eminent domain. As part of its police power, the government can exert significant control over the development and use of property. The government can rezone properties to ensure that they would be put to the desired use, or employ more indirect incentives to induce property owners to carry out the government’s will. Naturally, it is possible to combine strategies in appropriate cases.

E. Superfund

The Comprehensive Environmental Response, Compensation, and Liability Act²⁰⁹ (CERCLA or “Superfund”) is one of the most justly maligned pieces of environmental legislation ever adopted by Con-

²⁰⁷ James R. Neal, *Compulsory Pooling Promotes Conservation of Michigan’s Oil and Gas Natural Resources*, 78 Mich Bar J 158, 161 (1999) (defending Michigan’s compulsory pooling procedure as promoting a reasonable balance between conservation and development interests).

²⁰⁸ See Amnon Lehari and Amir N. Licht, *Eminent Domain, Inc.*, 107 Colum L Rev 1704, 1732 (2007).

²⁰⁹ Pub L No 96-510, 94 Stat 2767 (1980), codified as amended at 42 USC § 9601 et seq (2000) (creating a tax on the chemical and petroleum industries and providing broad federal authority to respond to the release or threatened release of hazardous waste).

gress. CERCLA was intended to clean up polluted land and prevent further contamination. In part, it did this by establishing guidelines for hazardous waste disposal, identifying “brownfields” (polluted parcels),²¹⁰ creating a Superfund to pay for cleanup, and identifying a large class of jointly and severally liable “potential responsible parties” who would have to contribute to the cost of cleanup. The actual results of the legislation have been underwhelming. Most brownfields remain polluted more than twenty-five years after the establishment of Superfund.²¹¹ The Act’s assumed dichotomy of polluted and clean lands often requires excessive cleanup, while the multiplicity of liable parties and the enormous liability costs encourage excessive litigation.

In a property rights analysis, CERCLA’s effect is to force the bundling of all brownfields with liability.²¹² Any potential purchaser of a polluted land parcel must automatically accept exposure to joint and several liability under CERCLA. This asset configuration can hardly be calculated to place brownfields under their most beneficial use. Survey data and scholarly literature emphasize that concern for future liability is a primary reason for brownfields remaining undeveloped.²¹³ And, indeed, there is little reason to suspect that an optimal developer of a brownfield will also be the optimal insurer of other parties’ CERCLA obligations. The result is a poorly configured asset comprising land plus liability that is suboptimally exploited.²¹⁴

A three-dimensional perspective offers a number of possibilities for redressing this problem. The most straightforward means lie in the asset dimension. If owners of Superfund sites were able to sell the brownfields without the attached liability, the pool of potential users would expand without in any way diminishing the pool of liable parties since all parties liable prior to the sale would maintain their status. Under current administrative practice, the EPA and states sometimes

²¹⁰ Subject to a handful of exceptions, CERCLA defines a brownfield as “real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.” 42 USC § 9601(39)(A).

²¹¹ For general information about Superfund, see EPA, *CERCLA Overview* (July 17, 2007), online at <http://www.epa.gov/superfund/policy/cercla.htm> (visited June 8, 2008).

²¹² See for example, Fenton D. Strickland, Note, *Brownfield Remediated? How the Bona Fide Prospective Purchaser Exemption from CERCLA Liability and the Windfall Lien Inhibit Brownfield Redevelopment*, 38 Ind L Rev 789, 789 (2005) (noting that many brownfields lay deserted and undeveloped because developers fear the risk of liability for cleanup costs under CERCLA).

²¹³ See generally Anna Alberini, et al, *The Role of Liability, Regulation, and Economic Incentives in Brownfield Remediation and Development: Evidence from Survey of Developers*, 35 Regional Sci and Urban Econ 327 (2005).

²¹⁴ See generally Howard F. Chang and Hilary Sigman, *The Effect of Joint and Several Liability under Superfund on Brownfields*, 27 Intl Rev L & Econ 363 (2007) (using a model of joint and several liability to show how liability risks from Superfund discourage the purchase of brownfields and emphasizing the effects arising from the potential buildup of defendants).

attempt to imitate this asset division by issuing “prospective purchaser agreements” assuring would-be purchasers that the EPA will not impose additional CERCLA responsibilities.²¹⁵ Formalization of the asset division could enhance the marketability of brownfields.

Less obviously, CERCLA could offer possibilities for immunity from liability while obtaining more limited rights. For example, CERCLA could offer greater immunity for many kinds of service providers and developers, permitting owners to subcontract for development without expanding the liability pool. This would permit greater owner calibration of dominion and asset configuration in order to maximize the efficiency of brownfield use.

F. Intellectual Property

We illustrate the usefulness of the two final strategies—fictional assets and differential acquisition rules. Intellectual property embodies an attempt to strike a balance between society’s desire to ensure adequate provision of intellectual goods and its interest in guaranteeing wide access to, and use of, the works once they have been produced. Intellectual property law strives to achieve this delicate balance by granting property protection to creators on the one hand, while imposing limits on the duration and scope of the rights on the other. Naturally, intellectual property law is not static. Rather, as we discussed in Part III.B, it is subject to constant adjustments and refinements.

Recently, an increasing number of commentators have cautioned that in the last several decades intellectual property owners managed to augment their protection at the expense of the public. The natural reaction of intellectual property theorists was to propose narrowing the rights of intellectual property owners (and, correspondingly, expanding those of the public).²¹⁶ For the most part, these proposals fall under the category of formalization of nonpossessory property interests. For example, expansion of fair use rights²¹⁷ does not seek to strip

²¹⁵ See generally *id.* See also Robert V. Percival, et al, *Environmental Regulation: Law, Science, and Policy* 269 (Aspen 4th ed 2003) (describing the EPA’s announcement in 1995 to promote the use of “comfort letters” for owners worried about continued CERCLA liability and, similarly, “prospective purchaser agreements” to assure potential buyers worried about future CERCLA liability); Zygmunt J.B. Plater, et al, *Environmental Law and Policy: Nature, Law, and Society* 1018 (Aspen 3d ed 2004).

²¹⁶ See, for example, Maureen Ryan, *Cyberspace as Public Space: A Public Trust Paradigm for Copyright in a Digital World*, 79 *Or L Rev* 647, 647–48 (2000) (noting the expansion of copyright holders’ rights at the expense of the public and seeking to arrest this trend by implementing principles of public trust to information).

²¹⁷ For proposals of this kind, see, for example, Gideon Parchomovsky and Kevin Goldman, *Fair Use Harbors*, 93 *Va L Rev* 1483, 1488 (2007) (proposing to expand fair use by formalizing fair use harbors that would supplement the current equitable analysis).

the asset away from the copyright holder but rather to reduce the holders' rights of exclusion.

Assuming that the critics are correct about the deleterious expansion of intellectual property rights, our analysis yields two interesting alternatives. Instead of scaling back protection, lawmakers can: (1) change the definition of the protected asset; and/or (2) make it more difficult to acquire protection by changing the prerequisites for acquiring property rights in intellectual goods. The first strategy is especially useful in the context of intellectual property. Intellectual goods are essentially fictional assets. For this reason, policymakers can redefine them with relative ease. Unlike a fox or other tangible assets, a copyright or a patent can be defined in many different ways. Current law illustrates this point. Copyright law affords protection to expression but not to the idea underlying it. Patent law, by contrast, does afford protection to the idea underlying an invention. Accordingly, if one believes that patent protection stifles competition in the product market, a possible solution may be to redefine the protected asset by excluding ideas from the scope of patent grants. A similar strategy may be applied to copyrights. For example, current copyright law protects, among many other works, compilations of preexisting public domain materials. Per our suggestion, policymakers could easily exclude such works from the definition of copyrightable subject matter.

The second strategy takes a different tack. Indeed, there are already many crucial differences in the acquisition rules pertaining to different kinds of intellectual property. Patent protection can be acquired only by securing approval from the Patent and Trademark Office after a fairly exacting review. Trademark law posts a much lower barrier: the use of a mark in commerce. Finally, copyright posts the lowest barrier of all: protection springs into existence when original expression is fixed in a tangible medium of expression. More importantly, the rules of acquisition change over time. For example, until the passage of the Copyright Act of 1976,²¹⁸ publication—not fixation—triggered copyright protection and unpublished works received no protection. International pressure prompted the US to drop the publication requirement and to settle for the much lower bar of fixation. In principle, however, the process is reversible. For example, if policymakers believe we have too many copyrights, they can address the problem by legislating stricter acquisition standards. For instance, in the context of copyright law, it is possible to substitute the lax originality standard for a much stricter “considerable creativity” requirement. Similarly, in the context of patent law, it is possible to replace the non-

²¹⁸ Pub L No 94-553, 90 Stat 2541, codified as amended at 17 USC § 101 et seq (2000).

obviousness standard—which requires an invention to be nontrivial to a person skilled in the relevant art—with the more stringent “inventive step” standard that is employed in Europe. Of course, the two strategies are not mutually exclusive and may easily be combined.

CONCLUSION

In this Article, we demonstrated the importance of adopting a three-dimensional approach to property law and policy. This approach maintains that every property determination can be analyzed along the dimensions of number of owners, the extent of their rights, and asset configurations. Careful analysis of the interaction among these dimensions is the key to understanding the deep structure of property law. Since each of the dimensions often pulls in a different direction, property law developed various strategies to optimize among them. Property law, as seen from a three-dimensional perspective, is a delicate balancing act that must often sacrifice one dimension for the sake of another.

Understanding property in this way makes many ostensible doctrinal anomalies disappear. In addition to its explanatory power, our three-dimensional approach offers a wide array of policy responses to property challenges. It suggests that every property challenge may be addressed on any one of the three dimensions or by any combination thereof. Accordingly, policymakers always have more than one option available to them. At the same time, they must be aware that intervention on one dimension will frequently lead to adjustments (or tensions) along the other two.

We also showed that that the three-dimensional view suggests a more nuanced evolutionary account of property rights. The inherent tension among the three dimensions causes property to be more shifty and ever-changing than is currently assumed. Understanding property law as a balancing act that spans three distinct, yet related, dimensions leads to a richer and more coherent view of the field. We hope that scholars and lawmakers will take advantage of this richness to tailor better solutions to current and future property problems. The message for policymakers is possibly even more valuable: every policy must be analyzed along all three dimensions. Intervention that does not take account of all three dimensions might often lead to unexpected adverse consequences and may even prove counterproductive.