

2012

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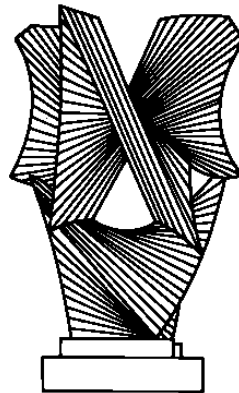
Lee Anne Fennell, "Lumpy Property" (John M. Olin Program in Law and Economics Working Paper No. 585, 2012).

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CHICAGO

JOHN M. OLIN LAW & ECONOMICS WORKING PAPER NO. 585
(2D SERIES)

PUBLIC LAW AND LEGAL THEORY WORKING PAPER NO. 371



LUMPY PROPERTY

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THE LAW SCHOOL
THE UNIVERSITY OF CHICAGO

January 2012

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LUMPY PROPERTY

*Lee Anne Fennell**

A bridge that only spans three-quarters of the distance across a chasm is useless, although far from costless. This standard, intuitive example of a lumpy, indivisible, or step good makes regular appearances in the literature on collective action.¹ But it also illustrates a point about discontinuities and complementarities that has broad, and mostly unexplored, significance for property law.² From land assemblies to takings doctrines to cotenant partitions to public housing to the *numerus clausus* principle, we see property delivering value—and being delivered to us—in certain identifiable, discontinuous chunks. This essay examines the implications of lumpiness for property theory and doctrine. Strains of this conceptual element run through some existing work on property,³ but the ways in which it may explain, justify, and challenge features of property law have not been systematically explored.

Viewing property through the lens of lumpiness matters for at least three reasons. The first is descriptive accuracy. Property law is lumpy as a positive matter, filled with doctrines and approaches that deal with the world in discrete, hard-to-divide chunks. It is not possible to understand how property operates without appreciating its lumpiness. The second reason lumpiness matters relates to questions of optimal property design. In evaluating the chunkiness that is built into property doctrines, we must ask whether and how it corresponds to underlying discontinuities in the production or consumption of property. A third reason for attending to

* Max Pam Professor of Law, University of Chicago Law School. I thank Ariel Porat and participants in the University of Pennsylvania Law School's New Dimensions in Property Theory Symposium for helpful comments and questions, and Aaron Benson and Eric Singer for excellent research assistance on this essay and related projects.

¹ See, e.g., RUSSELL HARDIN, COLLECTIVE ACTION 59 (1982) (discussing this example and noting some qualifications).

² This essay focuses exclusively on real and personal property, and thus does not engage the interesting complementarities and discontinuities that arise in intellectual property, nor the scholarship surrounding them. Lumpiness also holds relevance for many other areas of law besides property. For a brief overview, see Lee Anne Fennell, *Slices and Lumps*, U Chicago Law & Econ, Olin Working Paper No. 395 (2008), <http://ssrn.com/abstract=1106421>.

³ See, e.g., Henry E. Smith, *Institutions and Indirectness in Intellectual Property*, 157 U. PA. L. REV. 2083, passim (2009) (discussing lumpiness in property entitlements associated with the exclusion strategy); Henry E. Smith, *Self-Help and the Nature of Property*, 1 J. L. ECON. & POL'Y 69, 76 (2005) (suggesting efforts to control delineation costs lead property to be lumpy in nature); Thomas A. Merrill and Henry E. Smith, *The Morality of Property*, 48 WM. & MARY L. REV. 1849, 1862 (2007) (arguing that property's lumpiness introduces an asymmetry between owners and nonowners). Lumpiness also relates closely to the literature on assembly problems and economies of scale, some of the theoretical implications of which have been explored in the literature on the anticommons. See, e.g., Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998). For an extensive treatment of the relevance of scale for real property, see Robert C. Ellickson, *Property in Land*, 102 YALE L.J. 1315 (1993).

lumpiness is that many of property law's most important conflicts can be usefully framed as "lump versus lump." For example, an exercise of eminent domain may achieve a valuable spatial aggregation by splitting up some other aggregation, such as lengthy temporal attachments to the land, or a cohesive community that shares social capital.⁴ Recognizing the work that nonlinearities do in such stories can offer new traction on contemporary property debates.

The analysis here proceeds in four parts. Part I explains how and why we might regard property as lumpy. Part II examines how ideas connected to lumpiness enter into property law, whether as rationales for legal intervention, justifications for doctrinal protections, or bases for judicial or administrative outcomes. Part III turns to property theory. Here, I show how notions of lumpiness map onto current debates over the "bundle of rights" metaphor and over the relationship between exclusion and social obligation. This discussion also raises questions about the mutability and social contingency of property's lumpy nature. Part IV offers some analytic lessons that property scholars can take away from a study of lumpiness.

I. HOW AND WHY IS PROPERTY LUMPY?

Property entitlements that encompass strongly complementary elements may be said to have a lumpy or indivisible quality. To take a simple example, the four walls of a dwelling and its roof and foundation are generally viewed as strongly complementary. Removing any one element changes a fully-contained private shelter into a windbreak, cubicle, or lean-to. Depending on climate and social context, the last wall will often deliver a disproportionate amount of utility, just as the last segment of a bridge does. Similar, if more controversial, claims might implicitly underpin minimum standards for the quality and size of housing, minimum tenure lengths, minimum bundles of exclusion, use, and transfer rights, the use of eminent domain to assemble land into larger chunks, and many other legal doctrines and interventions. Before exploring these and other applications, it is necessary to work lay some definitional and taxonomic groundwork.

⁴ The effects of eminent domain on communities has received scholarly attention. See, e.g., Gideon Parchomovsky & Peter Siegelman, *Selling Mayberry: Communities and Individuals in Law and Economics*, 92 CALIF. L. REV. 75, 135-42 (2004) (creating a taxonomy of takings that recognizes different impacts on communities and that would adjust compensation accordingly); Amnon Lehavi, *How Property Can Create, Maintain, or Destroy Community*, 10 THEORETICAL INQ. L. 43, 73-74 (2009) (citing Parchomovsky & Siegelman, *supra*, and observing that eminent domain doctrine might be modified to "mak[e] governments realize that the property whole may be greater than the sum of its parts, even in allegedly informal community settings").

What's Lumpy?

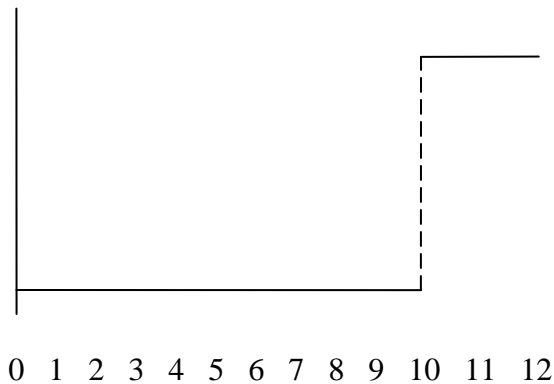
As Michael Taylor and Hugh Ward observe, some goods “cannot be usefully provided in *any* amounts but only in more or less massive ‘lumps.’”⁵ A good is lumpy (in one sense) if it provides benefits only when a particular quantity threshold is reached, rather than delivering utility in smoothly scalable units as quantities increase.⁶ More broadly, the notion of lumpiness is associated with various kinds of discontinuities, indivisibilities, nonlinearities, and complementarities.

1. Steps and Lumps

Lumpiness is a matter of degree. At the extreme, a good might take a “step” form, like the prototypical bridge shown in Figure 1—it is worthless until all the segments required to span the gap are in place, and gains no more value thereafter as more segments are added.⁷

Figure 1: The Bridge

Value



No. of Segments Assembled

⁵ Michael Taylor & Hugh Ward, *Chickens, Whales, and Lumpy Goods: Alternative Models of Public-Goods Provision*, 30 POL. STUD. 350, 353 (1982).

⁶ See, e.g., *id.*; Jean Hampton, *Free-Rider Problems in the Production of Collective Goods*, 3 ECON. & PHIL. 245, 248-50 (1987). My discussion of “lumpy goods” here is not limited to physical goods; services, conditions, and other intangibles also can exhibit lumpiness. See, e.g., Mark P. Gergen, *The Use of Open Terms in Contract*, 92 COLUM. L. REV. 997, 1011-19 (1992) (discussing how lumpiness may impact agent effort). Another sort of lumpiness stems from production limitations rather than consumption utility, as where a product can only economically be supplied in a particular size or quantity. See *infra* Part I.A.2.

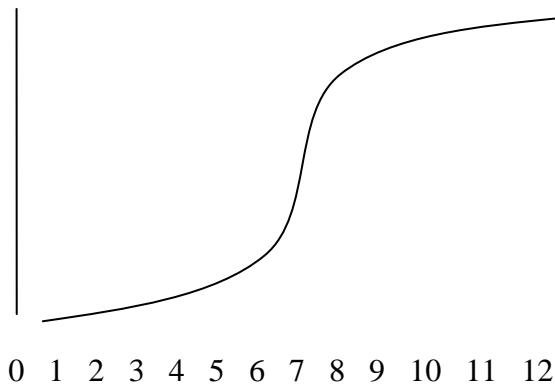
⁷ See, e.g., Hampton, *supra* note 6, at 248-49.

Such pure step goods are rare.⁸ But equally rare are goods with a smooth, continuous production function in which each infinitesimally fine unit of input is matched by a similarly fine adjustment in output or utility. In between the smoothly continuous production function and the single large step we find different degrees of nonlinearity or indivisibility.⁹

I will use the term lumpiness here to refer in a general way to severe discontinuities or nonlinearities in the production function, whether or not those functions take a pure step form or intersperse sharply increasing or decreasing returns with ranges exhibiting linearity.¹⁰ These differences in shape are important, however, because they can influence the prospects for cooperation and the risks of strategic behavior.¹¹ Figure 2 shows another example of a (relatively) lumpy good.

Figure 2: The S Curve

Value



No. of Pieces Assembled

⁸ Even the usual example of a step good, a bridge, does not really qualify; as Russell Hardin has pointed out, bridges exist at a wide variety of price and quality levels. See HARDIN, *supra* note 1, at 59.

⁹ See, e.g., Hampton, *supra* note 6 at 249-50 (discussing “steppy” and “mixed” goods).

¹⁰ Usages vary. Compare *id.* at 248 (equating “lumpy goods” with “pure step goods” and distinguishing both from hybrid forms like multi-step and mixed goods) with MARGARET LEVI, OF RULE AND REVENUE 57-58 (1989) (recognizing the possibility of “lumpy goods with sloping risers” that exhibit linearity “after the initial production threshold is reached”).

¹¹ See Pamela Oliver et al., *A Theory of the Critical Mass I. Interdependence, Group Heterogeneity, and the Production of Collective Action*, 91 AM. J. SOC. 522 (1985) (examining the relationship between production function shapes and the prospects for collective action); Lee Anne Fennell, *Common Interest Tragedies*, 98 NW. U. L. REV. 907, 971-78 (2004) (exploring this point in the context of land use and resource entitlements).

Although the good depicted in Figure 2 does not deliver all its value in a single shot, its production function contains ranges over which the marginal effect of added segments is sharply increasing or decreasing. The S-curve matches up with many collective goods that require a critical mass of participation to succeed, but that at some point plateau.¹² It might also fit with certain kinds of land assembly projects, where value increases sharply once a certain number of parcels are aggregated, but where having all the parcels is not essential.¹³ Nonlinearities might take many other forms as well.

2. What's In the Lump?

So far I have spoken of “segments” or “pieces” that produce value when aggregated together. As this formulation suggests, lumpiness or indivisibility often refers to quantities of relatively fungible inputs—pieces of a bridge, lengths of railroad track, tires for a car, units of work, years of housing tenure, and so on. Yet it may also refer to organic systems that have heterogeneous parts, such as a machine that requires all its parts to run.¹⁴ In the context of land assembly, the unique spatial location of each parcel may make the component parts nonfungible. Both homogenous and heterogeneous aggregations fit within the broad conception of lumpiness pursued here. What matters most to the shape of a given assembly problem is not whether the components are fungible with each other, but rather whether good substitutes exist for each of the components that is required for a given assembly.¹⁵

A second point is that the components may be temporal rather than physical in nature.¹⁶ Some goods, such as private residences, are often viewed as disproportionately valuable when consumed in lengthy, unbroken, temporal chunks. Sometimes the relevant chunk may be defined by reference to external events, such as the length of a life, a job, or an educational program. Property rights intentionally pre-bundle along the

¹² See Oliver et al., *supra* note 11, at 527-28 & fig. 1(a) (presenting and discussing an S-shaped “general third-order” production function).

¹³ For graphical representations and analysis of possible land assembly scenarios, see, for example, John F. McDonald, *What Is Public Use? Eminent Domain and the Kelo Decision*, 5 CORNELL REAL ESTATE REV. 10 (2007); Lee Anne Fennell, *Taking Eminent Domain Apart*, 2004 MICH. ST. L. REV. 957.

¹⁴ See ARNOLD M. FADEN, *ECONOMICS OF TIME AND SPACE* 208, 213 (1977).

¹⁵ Thus, even though a car may require many different mechanical parts to run (none of which could substitute for each other), there will be no difficulty assembling the necessary pieces as long as each part is readily available on the open market. Conversely, even if a group is building a bridge out of identical, interchangeable segments, there may yet be an assembly problem if there are no outside sources of bridge material and each individual in the group holds a segment essential to the whole.

¹⁶ Components may also take intangible forms such as units of effort, votes, rights, or permissions. See, e.g., HARDIN, *supra* note 1, at 59-61 (discussing an election victory as an example of a step good); Heller, *supra* note 3, at 635-42 (describing the problem of assembling fragmented property rights in post-Socialist Russia).

temporal dimension and, at least in the case of the fee simple absolute, do so in a very open-ended way.

B. *Lumpy Demand, Lumpy Supply, and the Law*

The fact that goods exhibit lumpiness or indivisibility means not that they are literally impossible to divide, but that they are considerably less valuable when divided, or that they are very expensive to divide (or to produce in smaller units in the first instance).¹⁷ As that explanation suggests, there are two distinct sources of indivisibility: the loss in consumption utility associated with dividing a lumpy good, and the production cost associated with pre-divided goods.¹⁸ These difficulties track onto lumpiness in demand, and lumpiness in supply, respectively. Lumpiness becomes noticeable and relevant when there is a mismatch between what is demanded and what is supplied.¹⁹

Consider first lumpy demand. Lumpiness may be a product of facts about the world (as presently constituted) that influence the utility people can derive from certain goods. Most people have two feet of similar size and follow the social custom of shodding them identically; this makes shoe purchases occur in lumps of two. Bridges are commonly crossed by transport units of a certain size and weight that are sensitive to gravity; these facts, combined with various structural principles, make bridges lumpy. People and their possessions are vulnerable to weather conditions and hence do disproportionately better in fully contained shelters than in ones that are missing a wall or a roof. In these cases and many others, the indivisibility relates to consumption utility, not to production processes that compel the provision of goods in particular chunks.²⁰ The lumpiness shows up in the demand curve, with little or no demand for quantities of the good below the critical threshold.²¹

In other instances, lumpiness stems not from consumption utility, but rather from the costs or technological limits of production. For example,

¹⁷ Indivisibility might carry a variety of other meanings. See FADEN, *supra* note 14, at 213-14 (listing six possible meanings of indivisibility).

¹⁸ Ward and Taylor similarly allude to these twin sources of lumpiness when they define lumpy goods as those that cannot be “usefully provided” in just any amount—if usefulness and provisioning represent two separate limitations. See Ward & Taylor, *supra* note 5, at 353.

¹⁹ If production and consumption exhibit closely correlated indivisibilities, lumpiness will be irrelevant. For example, if the smallest unit of candy that can be economically produced and sold separately is a 1.4 ounce candy bar, and if most people have no desire to purchase candy in smaller increments than this, whatever theoretical lumpiness may exist presents no difficulties. Similarly, if dental patients want root canal procedures that are completed rather than left unfinished, and dentists find it most profitable to offer complete root canal procedures rather than partial ones, everyone is happy (or as happy as people getting root canals can be).

²⁰ To the extent that bridges and houses require design work that is more cheaply provided in a lump, however, some indivisibility in production might also be present.

²¹ See Stephen Shmanske & Daniel Packey, *Lumpy Demand and the Diagrammatics of Aggregation*, 30 J. ECON. ED. 64 (1999).

the fixed costs associated with certain kinds of factory upgrades or expansions may make them affordably available only in certain-sized chunks. A firm that wants to expand its facilities or computerize its operations may find itself facing a choice between overshooting its intended mark and ending up with excess capacity in space or computing power, or getting by with inadequate amounts of these goods.²² Lumpiness in supply can also manifest itself in limited menus of products, where each variety requires a fixed minimum outlay.²³ Consider, for example, Henry Ford's decision to offer consumers of his Model T "a car painted any colour that he wants so long as it is black."²⁴ Here, the lumpiness is a function of the indivisible cost of setting up a particular production run, which requires a critical mass of consumption to support.

Finally, law often introduces indivisibilities. Firms may be required to offer, and people may be constrained to buy, certain bundles and not others. In the property context, the *numerus clausus* principle has the effect of producing a limited, and hence lumpy, menu. Other aspects of property law keep certain interests from being split up, or require that they be split only in particular ways. Legally imposed lumps push the inquiry back to the question of whether there are underlying discontinuities that explain why certain combinations of entitlements must occur together, or not at all.²⁵

C. Property Lumps

With the idea of lumpiness more clearly in mind, we can consider the ways in which property might be understood as lumpy. To start, property might be described as a lumpy institution to the extent that its defining features are associated with discontinuities or indivisibilities—and, indeed, to the extent it is even understood as having *a set* of defining features.²⁶ Yun-chien Chang and Henry Smith have recently identified three features they view as essential to property rights, each of which implicates lumpiness: *in rem* rights, the right to exclude, and "running with assets."²⁷

²² See, e.g., William J. Baumol & J. Gregory Sidak, *The Pig in the Python: Is Lumpy Capacity Investment Used and Useful?* 23 ENERGY L.J. 383, 385 (2002) (explaining that a utility must add to its capacity in minimum increments associated with generators or power plants, and observing that "[t]his inability to add capacity in tiny, tailor-made increments means that new capacity will often give the utility more capacity than it needs for immediate purposes").

²³ See generally JOEL WALDFOGEL, *THE TYRANNY OF THE MARKET: WHY YOU CAN'T ALWAYS GET WHAT YOU WANT* (2007).

²⁴ HENRY FORD (WITH SAMUEL CROWTHER), *MY LIFE AND WORK* 72 (1922); see also WALDFOGEL, *supra* note 23, at 119-20 (attributing Ford's choice to the costs of customization, as well as the quick-drying properties of black enamel).

²⁵ It also requires some explanation of why market forces would not already produce the optimal configuration, absent legal restrictions. See *infra* Part IV.B.

²⁶ This question bears on the larger theoretical debate about whether a "bundle of sticks" is an appropriate metaphor for property. See *infra* Part III.A.

²⁷ Yun-chien Chang & Henry E. Smith, *An Economic Analysis of Civil versus Common Law Property* 27-31 (working paper dated Aug. 27, 2011).

In rem rights lump together the world at large in defining duties toward a property owner, and hence economize on the production of legal relationships between owners and nonowners.²⁸ Exclusion protects a lumpy and undifferentiated set of uses by relying on a complete (rather than broken or partial) conceptual boundary around a resource's edges.²⁹ Rights that run with assets, and thus survive transfers of ownership, respond to property's temporal lumpiness.³⁰ Some interests in other people's land are most valuably consumed in temporal units that may exceed the length of the relationship between those specific other people and their land.

Doctrines for protecting, regulating, standardizing, adjudicating, and reconfiguring property entitlements may also be informed by (and limited by) ideas of lumpiness. I will examine such possibilities in detail in Part II. For now it is sufficient to note that property law often operates in a lumpy or lump-sensitive fashion—whether by strongly enforcing exclusion rights, rendering all-or-nothing judgments, limiting property configurations to certain clumps of rights, or coercively reaggregating entitlements to form more valuable wholes. Where legal doctrines rather than markets produce the operative lumps, interesting questions arise about the presence of absence of corresponding discontinuities in consumption utility or production efficiency.

At a larger scale, a system of property rights may itself embody or produce lumpy public goods. While there may be no single discrete “step” between a system of property rights that is too insecure to be meaningful and one which is sufficiently secure to induce widespread reliance and investment, it is likely that some threshold must be reached before the bulk of the benefits of the property system can be realized, and that beyond some very high level of security, additional increments add relatively little to perceptions of stability.³¹ Similarly, patterns of lumpy property use and consumption may produce second-order lumpy goods, like uniformity. Finally, there is the overarching question of whether the concept of property is itself lumpy, requiring some minimum set of attributes in order to warrant the name.³²

The balance of the essay explores how these facets of property's

²⁸ See *id.* at 28-29; see generally Thomas W. Merrill & Henry E. Smith, *The Property/Contract Interface*, 101 COLUM. L. REV. 773 (2001) (discussing the significance of the distinction between *in rem* rights associated with property, and *in personam* rights associated with contract).

²⁹ See, e.g., Henry E. Smith, *Property and Property Rules*, 79 N.Y.U.L. REV. 1719 (2004) (providing a detailed analysis of property's “exclusion strategy”); see also *infra* Part II.A.

³⁰ Chang and Smith focus not on temporal lumpiness as such, but instead suggest that this approach follows from viewing property as “a thing.” Chang & Smith, *supra* note 27, at 30-31.

³¹ In other words, the production of property security may follow an S-shaped curve like the one in Figure 2, if it requires a certain “critical mass” for success. For discussion and modeling of “critical mass” in various social and collective action contexts, see, for example, THOMAS C. SCHELLING, *MICROMOTIVES AND MACROBEHAVIOR* 91-110 (1978); Oliver et al., *supra* note 11.

³² See, e.g., Chang & Smith, *supra* note 27, at 40 (arguing that a legal relation that lacks one or more of three enumerated attributes of property is a “quasi-property relation”).

lumpiness interact with each other and with current debates over how to conceptualize and operationalize ownership.

II. LUMPY DOCTRINES

A variety of property doctrines deliver up lumpy or lump-sensitive results, or present people with lumpy choices. The sections below examine how lumpiness relates to three of property law's basic moves: enforcing exclusion, limiting configurations, and dividing and aggregating entitlements.

A. Enforcing Exclusion

An "exclusion strategy"³³ depends on defining resources as *things* with closed edges.³⁴ Just as a partial fence is no fence at all (if containment is the goal) and a partial bridge is no bridge at all (if traversing the span is the goal), leaving one side of a parcel of land unprotected from intruders undoes the idea of exclusion. Understanding property holdings as self-contained capsules with hard exclusionary edges makes property a very lumpy institution. On Henry Smith's account of modularity, ownership hides information about uses, and does so intentionally, in what amounts to a societal act of delegation.³⁵ This vision of property tracks well onto strong property rule protection against trespass and physical interference.³⁶ On this account, breaking open the capsule, even trivially, alters its integrity and may have any number of unanticipated effects that only the owner can fully know or appreciate.

This view of property helps to explain why even harmless encroachments may be addressed injunctively, or, failing that, strongly deterred with supercompensatory remedies. As Smith has emphasized, property protection legally constructs a discontinuity at the parcel's edges by making the consequences of boundary crossing highly significant.³⁷ That

³³ See Smith, *supra* note 29, *passim*.

³⁴ See Chang & Smith, *supra* note 27, at 4, 29. To say that an exclusion-based property interest requires complete boundaries does not mean it requires *impermeable* boundaries, nor does it require that the boundaries do all the work in protecting the property's value.

³⁵ See, e.g., Smith, *supra* note 29, at 1754-55 (discussing property as delegation); Henry E. Smith, *Community and Custom in Property*, 10 THEORETICAL INQ. L. 5, 16-18 (2009) (drawing connections between exclusion strategies and modularity, and noting the way that modules hide information); Henry E. Smith, *Modularity in Contracts: Boilerplate and Information Flow*, 104 MICH. L. REV. 1175, 1185 (2006) (explaining that "[e]xclusion rights implement the 'information hiding' or encapsulation that is the hallmark of modularity.>").

³⁶ See Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1092 (1972) (distinguishing property rules from liability rules).

³⁷ Smith, *supra* note 29, at 1750 (describing discontinuities in sanctions applied at property boundaries); see Robert Cooter, *Prices and Sanctions*, 84 COLUM. L. REV. 1523, 1523 (1984) (discussing the discontinuity that is produced by a sanction, which "typically creates an abrupt jump in an individual's costs when he passes from the permitted zone into the forbidden zone where behavior is sanctioned").

legal discontinuity operates on both sides of the border. Not only can trivial and harmless encroachments be prevented and punished, but very significant and harmful impacts emanating from outside the property's edges may either be entirely nonactionable, or may be redressable only with damages—a liability rule solution.³⁸

The question that an explicit focus on lumpiness pushes us to ask is whether the legally constructed discontinuity corresponds to some underlying discontinuity in how property is produced or consumed, or whether it is an artifact of an earlier set of social circumstances that we should be in the process of unwinding. The argument from modularity suggests an underlying lumpiness in consumption utility: if property's uses are very opaque and potentially idiosyncratic, having the whole thing may be enormously different from having almost the whole thing, and in ways nonowners could never hope to understand. But this is an empirically debatable proposition.

Significantly, most land in metropolitan areas today is subject to zoning and other forms of land use controls that take the mystery out of what the owner may be doing with her property. Moreover, modern threats to owners' holdings come less in the form of intrusions across boundary lines than effects emanating from beyond the property lines—what neighbors, merchants, governmental entities, and employers are doing in the surrounding area.³⁹ It is undoubtedly true that some owners have construction or other plans for their land that depend on retaining control over the full spatial and temporal footprint; for them, losing a little could mean losing a lot. This does not tell us, however, whether consumption discontinuities support generalizing a hard-edged exclusion strategy across the run of owners. It is also undoubtedly true that some owners have plans, like upgrading to a larger home as their family grows, that depend on retaining home equity that sums to a certain lump of monetary value. Yet we have not generalized a strategy for protecting owners against all threats to home equity.

A separate argument for strong exclusion rights turns on economies in the production of property protection. It may be more economical to produce protection that tracks parcel edges rather than protection that tracks dissipation of value, and cheaper to provide full-on injunctive protection than to provide graduated remedies that take account of the actual loss of value. In other words, the constructed discontinuity in legal consequences at the parcel edges may correspond to a discontinuity in the costs of producing legal protection. Yet again, we must examine the empirics of this

³⁸ See Calabresi & Melamed, *supra* note 36, at 1092.

³⁹ See generally LEE ANNE FENNELL, *THE UNBOUNDED HOME: PROPERTY VALUES BEYOND PROPERTY LINES* (2009).

claim. We would need to know not only the relative costs of different kinds of property protection, but also the extent to which each type of protection furthers the goals of property under present social conditions.

B. Limiting Configurations

By law, property is consumed in certain chunks rather than in all imaginable combinations. These legal restrictions may not, and need not, always relate to underlying discontinuities. Property law often responds to a continuous variable, like noise or density or space, by drawing a bright prohibitory line in some place, even if the things that fall on either side of the line resemble each other closely.⁴⁰ Thus, we should not assume that lumpiness explains (or must be invoked to explain) restrictions that merely operate as floors or ceilings along dimensions that produce externalities. But in the realm of property configurations, the law often does more than set simple minima or maxima in the name of externality (or even internality⁴¹) control. Instead, configurations are often limited for reasons that appear to circle back to matters of configuration itself. The sections below examine three examples: housing standards, the *numerus clausus* principle, and limits on fragmentation.

1. Housing Standards

Restrictions like housing codes and implied warranties of habitability mandate that residential property be consumed, if at all, in minimally habitable chunks. But because this mandate is not accompanied by a guarantee of habitable housing, households that cannot achieve the level of the minimum legal rental must instead rely on temporary shelters, sleeping on sidewalks, and so on. The result is a gap on the spectrum of legal housing. Very thin housing rights, such as a temporary sleeping space, are legal. Somewhat thicker ones, like a tar-paper shack, are illegal. The standard explanations for limits on housing involve controlling externalities or securing some minimum level of shelter for household members. But if housing arrangements that fall below a certain level are problematic on these grounds, it is hard to understand why it would be preferable to have a

⁴⁰ See, e.g., *Euclid v. Ambler Realty*, 272 U.S. 365, 388-89 (1926) (observing that laws that may be in some respects overinclusive may nonetheless be justified in contexts where “the bad fades into the good by such insensible degrees that the two are not capable of being readily distinguished and separated in terms of legislation”). The arguments for and against bright line responses to continuous variables relate to a well-known and extensive literature on rules versus standards. See, e.g., Pierre Schlag, *Rules and Standards*, 33 UCLA L. REV. 379 (1985).

⁴¹ Internalities are “within-person externalities”—the effects of one’s current choices on one’s future selves that one does not take into account. R.J. Herrnstein et al., *Utility Maximization and Melioration: Internalities in Individual Choice*, 6 J. BEHAV. DECISION-MAKING 149, 150 (1993).

system that pushes many families to a yet lower point on the housing hierarchy.⁴²

One set of explanations might relate to lumpiness in consumption utility. A welfare system that has six needy families and only enough building materials to construct one full dwelling might rationally decide not to divide the available building components equally among the families but rather focus on constructing one full unit. Public housing assistance follows roughly this approach by relying on queuing for access to housing that meets particular standards⁴³ rather than on pro rata distribution of housing dollars among all eligible families.⁴⁴ Those who are left out of this distribution may be relegated to homelessness or to crowding in with extended family or friends—a difficult result to defend. Yet an argument for deploying housing dollars in discrete lumps could follow from the (empirically debatable) claim that “incomplete” or substandard housing bundles add little to well-being up until the point where a certain quality threshold is reached.⁴⁵

An additional justification would be necessary to support interventions into private transactions over housing. One rationale might be based on the assumption that low-income households experience smaller utility discontinuities at the line between the almost-habitable and the minimally-habitable than their neighbors experience in the form of spillovers. Suppose, for example, that externalities stay the same or decrease only trivially as conditions improve within the substandard housing range, but drop dramatically once the minimum level of habitability is achieved. If externalities will be produced at roughly the same level no matter how far

⁴² A complication here relates to the spatial distribution of households at various housing levels. Externality control might indeed be the justification for keeping rental housing above a certain level in areas that where homeless people will not enter or remain. Yet areas in which homelessness is prevalent also maintain minimum housing standards for rental dwellings, presenting the puzzle noted in the text.

⁴³ Demand for public housing so far exceeds supply in some areas of the U.S. that families must enter a lottery to get a space on a lengthy waiting list. See, e.g., Chicago Housing Authority, Family Wait List Lottery FAQs, http://www.thecha.org/pages/family_wait_list_lottery_faqs/76.php (providing information about the 2010 random lottery that added 40,000 families to the wait list for Chicago public housing, and indicating that those who were successful in the lottery may have to wait five to seven years to be called for screening).

⁴⁴ David Super uses the term “functional entitlement” to denote public benefits that are provided at some specified level that is meant to be sufficient to meet a particular need. David A. Super, *The Political Economy of Entitlement*, 104 COLUM. L. REV. 633 (2004). Although he finds functional entitlements to be “relatively rare in public benefits law,” see *id.* at 657, housing assistance that requires units to meet certain standards fits the definition. See *id.* at 657 n.109.

⁴⁵ For a related discussion, see CHARLES KARELIS, *THE PERSISTENCE OF POVERTY* 67-81, 127-29 (2007). Karelis suggests that the marginal utility of money may rise within certain ranges because it allows larger and hence disproportionately more effective doses of relief to be applied. See also Milton Friedman & L.J. Savage, *The Utility Analysis of Choices Involving Risk*, 56 J. POL. ECON. 279, 298-99 (1948) (presenting the Friedman-Savage utility curve which hypothesizes that there are intervals in which the marginal utility of money is increasing); Sarah B. Lawsky, *On the Edge: Declining Marginal Utility and Tax Policy*, 95 MINN. L. REV. 904, 929-939 (2011) (discussing the Friedman-Savage curve). Notably, Karelis does not frame his argument in terms of lumpiness or discontinuities, and indeed disavows any connection between those ideas and his own. See KARELIS, *supra*, at 119-22. Nonetheless, the intuitive arguments that he makes are consistent with production functions that exhibit these features.

below the level of habitability households go, then externalities would be minimized by simply minimizing the number of households consuming substandard housing, without regard to how they are distributed among substandard housing types. Removing intermediate points between homelessness and minimally habitable leaseholds heightens the utility cliff a household will experience if it fails to achieve habitable housing. This move would create very strong incentives to obtain habitable housing, and hence would be expected to reduce the number of households in below-code territory—but not without normatively problematic impacts on those who are unable to respond to the incentive.

Individuals and households might also wish to enlist the law's help in constructing lumpy choices for bargaining purposes. Removing inferior alternatives from a choice set will have two effects: it will decrease the likelihood of obtaining the good, but will guarantee a better version of the good, conditional on obtaining it at all. The power of the chunky option lies in presenting one's bargaining partner with an all-or-nothing choice.⁴⁶ That removing alternatives can at times improve outcomes by altering the bargaining environment explains why individuals might support nonwaivable housing or employment rights—even though this means placing restrictions on their own choices.⁴⁷

Some housing restrictions might be aimed at producing network effects across neighborhoods or communities that parties acting independently would have difficulty producing. Here, the lumpy good in question would be a second-order one—the *pattern* of chunky consumption choices. This argument has been made, for example, in the context of accessibility features for people with disabilities: a world in which all properties are accessible is a very different one to navigate than a world in which accessibility is hit or miss, and there may well be nonlinearities associated with reaching certain thresholds of widespread accessibility.⁴⁸

⁴⁶ The all-or-nothing nature of the choice will only obtain if all dimensions of the offered good are constrained. Thus, a landlord who is forced to get a unit up to code or withdraw it from the market entirely does not really face a lumpy choice in terms of the surplus she must cede to a tenant if she can raise the rent accordingly; likewise, rent control does not guarantee a tenant a given amount of housing surplus unless it is accompanied by controls on the conditions of the premises that prevent landlords from withdrawing surplus through chiseling on maintenance and the provision of amenities. See, e.g., Margaret Jane Radin, *Residential Rent Control*, 15 PHIL. & PUB. AFF. 350, 373-74 (1986) (discussing the interaction between rent control and habitability standards).

⁴⁷ See Susan Rose-Ackerman, *Inalienability and the Theory of Property Rights*, 85 COLUM. L. REV. 931, 959 n.79 (1985); Russell Hardin, *The Utilitarian Logic of Liberalism*, 97 ETHICS 47, 58-62 (1986).

⁴⁸ See David A. Weisbach, *Toward a New Approach to Disability Law*, 2009 U. CHI. LEGAL F. 47, 98 (noting the possibility that private architectural choices regarding accessibility could have network effects); Robin Paul Malloy, *Inclusion by Design: Accessible Housing and Mobility Impairment*, 60 HASTINGS L.J. 699 (2009) (arguing for "inclusive design standards" for single-family homes). Other aspects of housing law might be directed at preserving community networks against the threat of dispersion. See, e.g., Radin, *supra* note 46, at 369 (discussing this rationale for rent control).

2. The *Numerus Clausus* Principle

Just as there is a gap on the housing spectrum between minimally permissible leaseholds and homelessness, there is also a gap between leaseholds on the one hand, and homeownership that meets certain standards in terms of financing arrangements and risk-bearing on the other. The gap leaves out a range of innovative hybrid arrangements that would blend elements of renting and owning.⁴⁹ The result is a lumpiness in property forms that requires households either to make a large jump in risk-bearing by becoming owners or to continue renting; households whose ideal point lies between the two tenure forms have to settle for more or less.⁵⁰ This seems hard to justify on externality grounds, given that the primary problems identified with intermediate forms—too much or too little risk-bearing—exist in even stronger form with traditional homeownership or traditional leaseholds.

The gap on the tenure spectrum can be explained doctrinally by the *numerus clausus* principle; property law clusters around certain approved tenure forms and disapproves new customizations and hybrids.⁵¹ But we still must explain the principle itself. Thomas Merrill and Henry Smith offer one rationale: that idiosyncratic tenure forms impose informational externalities by making it harder for both potential counterparties and strangers to learn about the relevant rights.⁵² These claims are open to question.⁵³ As long as ownership sticks to exclusion as its dominant and defining strategy, the details of the tenure form should be of no concern to those hoping to steer clear of a property violation; they simply stay off.⁵⁴ Nor is the information environment facing would-be transactors materially simplified by having limited forms, given the innumerable other

⁴⁹ Such hybrids are not entirely absent, but they are limited in scope and are not well-supported by current tax and regulatory regimes. See, e.g., Andrew Caplin et al., *Rectifying the Tax Treatment of Shared Appreciation Mortgages*, 62 TAX L REV 505, 514–29 (2009); Andrew Caplin, et al, *Home Equity Insurance: A Pilot Project* *24-28 (Yale International Center for Finance Working Paper No 03-12, May 2003), online at http://ssrn.com/abstract_id=410141.

⁵⁰ ANDREW CAPLIN, ET AL, HOUSING PARTNERSHIPS: A NEW APPROACH TO A MARKET AT A CROSSROADS 6 (1997) (“The ‘all or nothing’ constraint on home ownership forces households to make the stark choice between rental accommodations’ disadvantages and complete ownership’s harsh financial realities.”).

⁵¹ See, e.g., Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 YALE L.J. 1 (2000); Nestor M. Davidson, *Standardization and Pluralism in Property Law*, 61 VAND. L. REV. 1597 (2008).

⁵² See Merrill & Smith, *supra* note 51, at 31–34. A number of other rationales for the doctrine have also been posited. See, e.g., Bernard Rudden, *Economic Theory v. Property Law: The Numerus Clausus Problem*, in OXFORD ESSAYS IN JURISPRUDENCE, 3D SERIES 237, 245–63 (John Eekelaar & John Bell eds., 1987) (considering and critiquing a variety of explanations); Henry Hansmann & Reinier Kraakman, *Property, Contract, and Verification: The Numerus Clausus Problem and the Divisibility of Rights*, 31 J. LEGAL STUD. 373 (2002) (suggesting that limited forms help to serve a verification function when rights are divided).

⁵³ For a compelling critique, see Glen O. Robinson, *Personal Property Servitudes*, 71 U. CHI. L. REV. 1449, 1484–88 (2004).

⁵⁴ This observation suggests that some of the elements that have been treated as complementary by property scholars could actually operate as substitutes. On this account, an exclusion strategy might facilitate relaxation of the *numerus clausus* principle.

nonstandardized features about which they must learn before engaging in a transaction.⁵⁵

Having everyone consume just a few recognizable forms of property might, however, produce other benefits. There may be economies in producing and comprehending law, for example, if legal restrictions can be more easily built around identifiable tenure nodes.⁵⁶ Other network effects, such as social cohesiveness and trust, might be associated with everyone in a given neighborhood sharing the same tenure form.⁵⁷ Yet even if we accept informational or network externalities as an argument for a limited menu, we would still want some account of why the particular entries on our current property menu are at least roughly the correct ones, both in number and content. We would also want to know whether the scale at which the limited menu operates tracks the scale at which uniformity produces these benefits. The reason is one that Merrill and Smith themselves identify: there are “frustration costs” associated with being unable to pursue desired customizations.⁵⁸

3. Limiting Fragmentation to Ease Reconfiguration

The idea that certain property aggregations or disaggregations can produce disproportionate value runs through much of property law and theory. As we will see, it is often used to justify coercive reconfigurations.⁵⁹ But the law might also limit certain configurations in an attempt to improve or conserve opportunities for future *non-coercive* reaggregation.⁶⁰ This rationale has been invoked as a potential explanation of everything from minimum lot sizes to the rule against perpetuities.⁶¹

The issue of reconfiguration arises when there is a change over time in the optimal scale of resource use.⁶² For example, land that was most valuable when subdivided into townhouse-sized parcels at Time 1 might at Time 2 be best suited to a large shopping center or an urban park. Such

⁵⁵ See Robinson, *supra* note 53, at 1487-88.

⁵⁶ See Davidson, *supra* note 51, at 1655-60 (discussing the *numerus clausus* doctrine as a “regulatory platform”).

⁵⁷ See Lee Anne Fennell, *Unbundling Risk*, 60 DUKE L.J. 1285, 1344 (2011).

⁵⁸ Merrill & Smith, *supra* note 51, at 35-38.

⁵⁹ See *infra* Part II.C.

⁶⁰ See Michael A. Heller, *The Boundaries of Private Property*, 108 YALE L.J. 1163, 1173-82 (1999); see also Robert C. Ellickson, *Property in Land*, 102 YALE L.J. 1315, 1374 (1993); Frank I. Michelman, *Ethics, Economics, and the Law of Property*, in NOMOS XXIV: ETHICS, ECONOMICS AND THE LAW 3, 15-16 (J. Roland Pennock & John W. Chapman eds., 1982); Henry E. Smith, *The Language of Property: Form, Context, and Audience*, 55 STAN. L. REV. 1105, 1143 & n.137 (2003).

⁶¹ See, e.g., Heller, *supra* note 60, at 1173, 1179-80.

⁶² See, e.g., Lee Anne Fennell, *Commons, Anticommons, Semicommons*, in RESEARCH HANDBOOK ON THE ECONOMICS OF PROPERTY LAW 35, 48 (Kenneth Ayotte & Henry E. Smith, eds., 2011) (discussing the problem of shifting efficient scale over time); Abraham Bell & Gideon Parchomovsky, *Reconfiguring Property in Three Dimensions*, 75 U. CHI. L. REV. 1015, 1024 (2008) (observing that “[a]ggregation and disaggregation of parcels in order to permit each use as it becomes most efficient is not an easy matter”).

changes effectively shift the inflection point at which increasing returns to scale stop, and diminishing returns set in (or vice versa). Thus, minor changes in scale may at times dictate a major change in use, with associated effects on overall social value. Stephen Shmanske and Daniel Packey give the example of a golf course that requires a minimum of 91 acres to be viable.⁶³ If only 90 acres can be assembled, the land may be relegated to a lower-valued use, such as open space.⁶⁴

A change in the optimal scale of use can introduce a mismatch between the chunks in which property is supplied (by those who already hold it) and the chunks in which it is demanded. Here we see an interesting feature of real property that distinguishes it from many other products and services: it is supplied in packages and quantities that are determined solely by past patterns of ownership and use, and by the legal rules governing transfers.⁶⁵ The old maxim about real estate—“they aren’t making any more of it”⁶⁶—translates into a strong and important technological constraint on the ability of supply decisions to adapt to current demand conditions. All of the property available for use by future owners exists in the hands of current owners, each of whom holds a spatial monopoly. Although these spatial monopolies provide little leverage under most circumstances (close locational substitutes typically abound), they can produce well-known difficulties when individually owned parcels represent integral and complementary pieces of a much more valuable whole.

All of this is well recognized. What is less clear is whether and when the costs of restricting alienability (that is, keeping present transactors from slicing entitlements as thinly and idiosyncratically as they desire) are outweighed by the prospects of easing future reconfiguration difficulties. The answer depends on a variety of factors, including the degree to which we can reliably predict the optimal scale of future uses,⁶⁷ the relative cost of coercive reconfiguration,⁶⁸ and the likely shape of the production functions

⁶³ Shmanske & Packey, *supra* note 21, at 72.

⁶⁴ *Id.*

⁶⁵ Cf. Larissa Katz, *Exclusion and Exclusivity in Property Law*, 58 U. TORONTO L.J. 275, 307-08 (2008) (“Pre-owned resources, and land in particular, bear the legal and physical imprint of the agendas set by prior owners.”) (footnote omitted).

⁶⁶ A variant of this aphorism has been attributed to Will Rogers. See PETER WOLF, *LAND IN AMERICA: ITS VALUE, USE, AND CONTROL* 6 (1981) (“Will Rogers advised the whole country: ‘Buy land. They ain’t making any more of the stuff.’”).

⁶⁷ See Larissa Katz, *Red Tape and Gridlock*, 23 CANADIAN J. L. & JURIS.99, 120-21 (2010) (arguing that Michael Heller’s approach implicitly and incorrectly assumes that we can identify a resource’s “ideal use” in advance, and arrange property rights to achieve it).

⁶⁸ See *infra* Part II.C. To the extent that coercive overrides become necessary, the “ease of reconfiguration” advantages associated with restricting property configurations become moot. Limits on fragmentation may reduce the total number of pieces to be assembled, and so may improve the prospects for private transactions or at least reduce the number of owners who must be coerced. But there is a potential nonlinearity here as well: If the costs of private assemblies become prohibitive once a certain threshold of complementarity and numerosity is reached, and if it is entirely inefficient to keep property in large enough chunks to stay below that threshold, then blocking desired fragmentation could be a futile effort that frustrates current would-be transactors without providing significant benefits to later would-be transactors.

through which particular aggregations generate value. For example, it will typically be unclear whether future efficient uses will require more aggregation or more disaggregation. Anticommons theorists focus their attention exclusively on the dangers of fragmentation, which would suggest that only reaggregation poses problems.⁶⁹ But if consolidated holdings implicate the interests of multiple stakeholders who hold either de facto or de jure vetoes, disaggregation may also prove difficult. For example, moves that take property out of common ownership and into individual ownership may be blocked by holdout dynamics.⁷⁰

There are many other complications that have not received attention from legal scholars. For example, imagine that a developer needs a contiguous 85-acre parcel within an area containing 100 acres. Will her chances of a private assembly be better if she faces five owners who each own 20-acre lots, or 100 owners who each own one-acre lots? It is impossible to be sure without more information,⁷¹ but we can say this much: each owner's contribution will be critical in the case of 20-acre holdings, whereas fifteen owners' contributions will be unnecessary where the pieces are smaller. Once we consider the possibility that production functions can vary depending on the size of the pieces in play, it is no longer self-evident that smaller holdings always perform less well on private aggregation tasks.

C. *Dividing and Aggregating*

As the discussion above has already suggested, property law is deeply concerned with questions of entitlement division and aggregation. In an important sense, property *is* aggregation, insofar as it derives much of its value from clumping together, and making durable, sets of rights. At the same time, property law is often called upon to divide entitlements in various ways. When market transactions prove unequal to the task of shifting from one scale of use or form of ownership to another, the government may turn to coercive reconfiguration, as through eminent

⁶⁹ See, e.g., Heller, *supra* note 60, at 1165–69; Francesco Parisi, *Entropy in Property*, 50 AM. J. COMP. L. 595, 626–27 (2002).

⁷⁰ See, e.g., CARL J. DAHLMAN, THE OPEN FIELD SYSTEM AND BEYOND: A PROPERTY RIGHTS ANALYSIS OF AN ECONOMIC INSTITUTION 187 (1980); Carol M. Rose, *Evolution of Property Rights*, in 2 THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW 93, 97 (Peter Newman, ed., 1998); see also Fennell, *supra* note 62 (discussing such possibilities).

⁷¹ For example, we would need to know the degree to which contiguity is required or whether there are other constraints on the shape or configuration of the assembled parcels. These questions will determine the degree to which different parcels are in competition with each other, and the degree to which the problem breaks down into one in which some smaller subset of parcels (such as those in the core of the configuration) exhibit perfect complementarity. See Scott Duke Kominers & E. Glen Weyl, *Holdout in the Assembly of Complements: A Problem for Market Design*, AM. ECON. REV. (Papers & Proceedings) (forthcoming 2012) (comparing assembly problems exhibiting perfect complementarity with those that require all the components in one of several possible clusters, and with those that require one component from each of several clusters).

domain or partition.⁷² The doctrines surrounding these operations are, or should be, sensitive to the ways in which aggregations of entitlements may produce nonlinear lumps of value.

1. Eminent Domain

Property's lumpiness arises most saliently in the context of land assembly. Eminent domain routinely addresses settings where the whole is (or may be) greater than the sum of its parts. Sometimes this is dramatically so, as where a planned highway (much like a bridge) becomes close to useless if segments are missing from it. In other cases, having all the pieces of a particular contiguous holding will greatly increase the value of the parcel as a whole, even if it is possible to glean some returns from something short of the whole. Relying on private transactions to assemble land is one alternative, and configuration rules may bear on the ease or difficulty of these transactions. But a core problem of monopoly power, coupled with private information about reservation prices, can plague many attempted aggregations.⁷³ Thus, private efforts to reconfigure property—whether to achieve more efficient lumps or to break down inefficient lumps—may run aground due to strategic bargaining problems or other transaction costs.

Coercive overrides solve this problem, but carry costs of their own. Notably, it is often unclear whether an assembly is efficient, or whether the property is collectively more valuable in pieces. Private transactions rule out inefficient assemblies, but bargaining impasse may block efficient assemblies. Eminent domain and other coercive transfers solve this second problem, but at the potential cost of allowing some inefficient assemblies to go forward. Explicitly recognizing lumpiness provides traction on the rationale for coercion and thereby affords a reasoned basis for constructing functional limits.⁷⁴ Significantly, however, the spatial aggregation facilitated by eminent domain may not be the only aggregation in the picture: there may also be temporal or community-based aggregations that will be split up as a result.⁷⁵ Differences in the respective production functions of the competing assemblies can also have a large impact on the need for, and impact of, coercive reconfigurations.⁷⁶

⁷² See, e.g., Bell & Parchomovsky, *supra* note 62, at 1018 (discussing “forced reconfiguration”).

⁷³ See, e.g., Thomas W. Merrill, *The Economics of Public Use*, 72 CORNELL L. REV. 61, 74-75 (1986) (discussing monopoly problems presented in assembly projects).

⁷⁴ See Merrill, *supra* note 73, at 65 (analyzing eminent domain as a means for overcoming impediments to private bargains under “thin market” conditions); see also *infra* Part IV.C.

⁷⁵ See, e.g., Parchomovsky & Siegelman, *supra* note 4, at 135-42.

⁷⁶ See *supra* Part IV.C.

2. Regulatory Takings Doctrine

Sometimes coercive aggregations occur not through condemnation of land but rather through regulatory action that seeks to achieve some consistent result across parcels or to otherwise employ existing property rights in pursuit of a collective goal. Some of the lumpiness-related points discussed in the context of exclusion reappear in takings doctrine. The most obvious manifestation is *Loretto*'s per se rule for permanent physical encroachments, no matter how small.⁷⁷ This rule deepens the discontinuity in legal results at the property's boundary by treating even trivial physical incursions as takings for which just compensation must be paid,⁷⁸ even when severe financial impacts associated with regulatory changes go uncompensated.⁷⁹

Another important line in takings law proceeds from the premise that losing *all* of some particular interest (even one that is not terribly valuable) is a more severe interference than losing *part* of the value of an interest—even if the dollar value of the interference is much larger in the latter case than in the former. This idea appears in *Lucas*'s per se rule, which holds that regulations that remove *all* economically viable use will always constitute takings except where those regulations reflect background restrictions on title.⁸⁰ It also surfaces in the Court's invocation of "distinct, investment-backed expectations" in the *Penn Central* test.⁸¹ And the same "all versus some" distinction features in *Tahoe-Sierra*'s and *Penn Central*'s refusals to allow claimants to "conceptually sever" time slices and air rights, respectively.⁸²

Initially this distinction might seem to be in tension with a notion of

⁷⁷ *Loretto v. Teleprompter*, 458 U.S. 419 (1982).

⁷⁸ The argument from lumpiness might be taken even further: given complementarities, paying for the encroachment alone may be undercompensatory. A more protective rule might put the government to a choice between taking a larger chunk than it might otherwise choose (and compensating for it), or taking nothing. See Bell & Parchomovsky, *supra* note 62, at 1064-65 (observing that an "asset-oriented perspective" would argue against a "minimalist" approach of taking as little through eminent domain as possible). At the extreme, a takee from whom the government proposes to take just a small slice might receive a put option that would enable her to force a sale to the government of the full parcel at its fair market value.

⁷⁹ See e.g., Richard A. Epstein, *The Seven Deadly Sins of Takings Law: The Dissents in Lucas v. South Carolina Coastal Council*, 26 LOY. L.A. L. REV. 955, 957-59 (1993) (criticizing the distinction takings law draws between physical impositions and reductions in value).

⁸⁰ See *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992).

⁸¹ *Penn Central*, 438 U.S. at 124; see also *Lingle v. Chevron*, 544 U.S. 528, 538-39 (2005) (reiterating the *Penn Central* test, including the factor of "distinct, investment-backed expectations."). The phrase was based on Frank Michelman's notion of a "distinctly perceived, sharply crystallized, investment-backed expectation." Frank I. Michelman, *Property, Utility, and Fairness: Comments on the Ethical Foundation of "Just Compensation"* Law, 80 HARV. L. REV. 1165, 1233 (1967).

⁸² *Penn Central*, 438 U.S. at 130 ("Taking' jurisprudence does not divide a single parcel into discrete segments and attempt to determine whether rights in a particular segment have been entirely abrogated."); *Tahoe-Sierra*, 535 U.S. at 331 ("Petitioners' 'conceptual severance' argument is unavailing because it ignores *Penn Central*'s admonition that in regulatory takings cases we must focus on 'the parcel as a whole.'"). The term "conceptual severance" was coined by Margaret Jane Radin, *The Liberal Conception of Property: Cross Currents in the Jurisprudence of Takings*, 88 COLUM. L. REV. 1667, 1667, 1674-79 (1998).

lumpiness, and with my suggestion above that physical encroachments are problematic precisely because they break open a unified whole. But note that the “all versus some” distinction is applied in contexts where there is no permanent physical encroachment, but rather an interference with one or more ways of deriving value from property. Where a subset of value is drained away, the interference is arguably more analogous to a stock losing some increment of fungible value than to breaking open a capsule.⁸³ The point could be disputed, of course. The “capsule” in question might be a broad set of options for future property use, so that curtailing the frontier of possibilities makes the interest into a distinctly lesser thing. If we thought potential uses were like segments of a bridge that stack together to produce a unified repository of value that loses its purpose altogether when even one is removed—a web of value that unravels wholly whenever the government pulls on a single thread—then this would be the case.

In contrast, current regulatory takings doctrine seems to almost assume a form of reverse lumpiness in which one does not much notice or mind that one has lost *anything*, until one has lost almost the *whole* thing—or at least *some* whole thing. Unlike a bridge or car that stops generating value after the first major part is removed, property on this account is more like a tank of gas that generates excellent value right up until the point that it runs out entirely. Pushing the analogy a little further, compare the effects of gasoline siphoning on *A*, whose large vehicle has half its 30-gallon tank drained away, and on *B*, who owns three vehicles with 10 gallon tanks, one of which is drained entirely. *A* suffers a greater loss in absolute terms (15 gallons rather than 10 gallons) but *B* loses more in vehicular functionality.

Whether or not property should be viewed in these terms is open to question. As Frank Michelman has observed, there may be something psychologically salient, and especially demoralizing, about losing an entire thing to the government’s act.⁸⁴ That reaction might be a product of the binary way that objects tend to be acquired—all at once, at a single moment in time, rather than through a process of slow accretion.⁸⁵ If people tend to think in all-or-nothing lumps as a result of acquisition protocols, then they might be especially inclined to think in all-or-nothing terms when it comes

⁸³ This observation raises the question of why value losses are not counted as takings, an inquiry that relates conceptually to the literature on the line between taxes and takings. See, e.g., Amnon Lehavi, *The Taking/Taxing Taxonomy*, 88 TEX. L. REV. 1235, 1238 (2010) (emphasizing the law’s differential treatment of governmental acts that reduce value and those that interfere with exclusion or other core property rights) For a novel discontinuity-based argument for the distinction (albeit one that would require some changes in current takings doctrine), see Eric Kades, *Drawing the Line Between Taxes and Takings: The Continuous Burdens Principle and Its Broader Application*, 97 NW. U. L. REV. 189, 223-60 (2002) (describing and normatively defending the “continuous burdens principle” under which compensation is required for governmental acts that introduce a sharp discontinuity between the burdens that different individuals must bear).

⁸⁴ Michelman, *supra* note 81, at 1234 (noting this possibility but observing that the empirical truth of this proposition is “surely debatable”)

⁸⁵ Adverse possession and prescriptive claims are notable exceptions. There are also a variety of lease-to-own and installment purchases arrangements that spread acquisition over time.

to losing value. The question remains, however, whether this is simply a psychological artifact that proves misleading in the takings realm, or whether it tracks onto something meaningful about how people experience—or produce value on—property.⁸⁶

Another potential rationale for the “discrete twig”⁸⁷ approach to takings law might lie in production cost discontinuities—here the cost of producing protection from disproportionate burdens. Michelman’s notion of settlement costs bears on this point.⁸⁸ If screening for and settling up over thing-loss is relatively cheap, this may help to explain why the law might introduce a discontinuity into doctrine at the point of complete loss.

3. Judicial Takings

The Supreme Court’s recent, inconclusive decision in *Stop the Beach Renourishment*⁸⁹ has drawn new attention to the question of judicial takings—the possibility that a court-initiated change in property law could amount to a compensable taking. A significant concern for many is that such a doctrine might hamper courts in carrying out the usual business of adjudication, and thereby impair the organic development of the common law.⁹⁰ In the search for limiting principles, the notion of lumpiness might well play a role.

Consider again the recurring theme in takings law that losing a discrete thing is a more severe interference than losing a portion of a thing’s value, and hence more likely to be considered a taking. Transplanted into the judicial realm, this principle would seem to offer little insulation against the threat to common law adjudication. After all, many property disputes involve precisely who will get some discrete interest, such as an easement, a chattel, or even an estate in land. But examining lumpiness on the other side of the transaction provides traction, and a potential limiting principle. In virtually all regulatory takings committed by political actors, the thing taken from the owner is not just shifted to someone else, but rather is combined with interests taken from other owners to form a larger assemblage of entitlements. Just as eminent domain can explicitly generate

⁸⁶ For discussion on perceptions of property, and the extent to which those perceptions are manipulable, see, for example, Jonathan Remy Nash & Stephanie M. Stern, *Property Frames*, 87 WASH. U. L. REV. 449 (2010).

⁸⁷ Michelman, *supra* note 87, at 1233.

⁸⁸ Michelman, *supra* note 81, at 1214 (defining “settlement costs”); see also *id.* at 1234 (describing as “probably true” the proposition that such “specially painful” deprivations of a discrete thing “can usually be identified by compensation tribunals with relative ease”).

⁸⁹ *Stop the Beach Renourishment, Inc. v. Florida Department of Environmental Protection*, 560 U.S. __; 130 S. Ct. 2592 (2010). Although the Court was unanimous in finding that no judicial taking occurred in the case at hand, a four-Justice plurality endorsed the idea of a judicial taking.

⁹⁰ See, e.g., Stacey L. Dogan & Ernest A. Young, *Judicial Takings and Collateral Attack on State Court Property Decisions*, 6 DUKE J. CONST. L. & PUB. POL’Y, 107, 113 (2011); Timothy M. Mulvaney, *The New Judicial Takings Construct*, 120 YALE L.J. ONLINE 247 (2011).

an assembly surplus by putting together parcels of land, regulatory action generates surplus through regulatory assemblages, whether a path along a beach or a conservation goal or a uniform plan for the preservation of landmarks.

In most adjudicated property disputes, in contrast, the only question may be “who owns this twig?” Either way the case goes, it will remain a twig. In rare cases, though, a judicial decision could have the effect of assembling many property interests together to achieve a larger goal. For example, a court might change beach access rights and thereby effectively construct a new easement across the property of many landowners.⁹¹ Such an exercise more closely resembles the acts of eminent domain undertaken by the political branches, and looks less like the ordinary stuff of resolving disputes.⁹² The pursuit of regulatory or spatial lumps might thus be used to help pour content into an emerging judicial takings doctrine.⁹³

4. Ordinary Adjudication

Despite occasional results like the one in *Popov v. Hayashi*,⁹⁴ which split ownership of a home run baseball, property law usually delivers all-or-nothing outcomes.⁹⁵ Does the lumpy character of these decisions match some underlying feature of the way utility is thought to map onto property, or is there something about the process of producing results that creates pressure toward lumpy outcomes? The questions are empirical ones, but both suppositions could play a role. Land and other things may be much more valuable when kept physically and temporally intact, and high transaction costs might impede reuniting the whole if pieces were dispersed among litigants. A system that dispenses lumpy outcomes may also be cheaper to administer. The party with the weaker claim to an asset cannot gain leverage by winning a fractional share, nor need courts attempt to parse the relative strength of claims that fall short of the level necessary to tip the entire case to a win.

The treatment of covenants’ interests in partition cases offers an interesting window into the lumpiness of property adjudication precisely

⁹¹ See Joseph L. Sax, *Takings and the Police Power*, 74 YALE L.J. 36, 62 (1965) (making an analogous distinction “between the role of government as participant and the government as mediator in the process of competition among economic claims.”).

⁹² Cf. Thomas W. Merrill, *Why Lingle Is Half Right*, 11 VT. J. ENVTL L. 421, 424-28 (2010) (describing a “boundary maintenance” approach to regulatory takings that examines both how much a given regulatory act resembles eminent domain and how much it resembles an exercise of the police power).

⁹³ The question of whether a judicial takings doctrine should be recognized at all is one I do not take up here.

⁹⁴ Superior Court of California, Dec. 18, 2002. See also LEO KATZ, WHY THE LAW IS SO PERVERSE 139-56 (2011); R.H. Helms, *Equitable Division and the Law of Finders*, 52 FORD. L. REV. 313 (1983) (assessing the prospects for equitable division in the law of finding and noting its limited use in some joint finder cases).

⁹⁵ See, e.g., JESSE DUKEMINIER ET AL., PROPERTY 113 (7th ed. 2010) (noting the “all or nothing” nature of the property law of finders).

because the concurrent interests of the parties preclude an entirely all-or-nothing outcome. Although traditionally preferred, partition in kind (physically dividing the land) is much less common than partition by sale, which keeps the land intact.⁹⁶ The widespread use of partition by sale, and the rationales underlying it, map onto notions of spatial lumpiness. If cutting up the land into pieces will render it less valuable, courts will often order a sale instead.⁹⁷ What, then, could account for the historical preference for partition in kind? The answer may be found in temporal lumpiness. For example, an elderly cotenant who has resided on a parcel her whole life may experience an extraordinarily sharp discontinuity in utility between being allowed to stay there to the end of her life, and being ousted even a very short period earlier.⁹⁸ To return to a metaphor introduced earlier, partition must break open the capsule of property, either spatially or temporally; the question is which of the two is less costly.

III. LUMPINESS AND PROPERTY THEORY

If property is lumpy in the ways just suggested, what does that mean for property theory? In the sections that follow, I will sketch the implications of lumpiness for two current theoretical debates. Section A addresses the bundle of sticks metaphor and Section B considers the tension between exclusion and social obligation.

A. Bundles and Sticks

The idea of property as a “bundle of sticks” or “bundle of rights” has been associated with the work of the legal realists, and, more recently, the law and economics movement.⁹⁹ The metaphor has come under sustained

⁹⁶ See JESSE DUKEMINIER ET AL., PROPERTY 343 (7th ed. 2010)

⁹⁷ See, e.g., Johnson v. Hendrickson, 24 N.W.2d 914, 916 (S.D. 1946) (applying a statute that it read to permit partition by sale “if it appears to the satisfaction of the court that the value of the land when divided into parcels is substantially less than its value when owned by one person”).

⁹⁸ This rationale seems to have been in play in *Delfino v. Vealencis*, 436 A.2d 27 (Conn. 1980), a case in which the court ordered partition in kind. *Id.* at 33 (observing that “one of the tenants in common has been in actual and exclusive possession of a portion of the property for a substantial period of time; that the tenant has made her home on the property; and that she derives her livelihood from the operation of a business on this portion of the property, as her family before her has for many years”); see also *Ark Land Co. v. Harper*, 599 S.E. 2d 754, 761 (W. Va. 2004) (holding that economic value alone is not dispositive, and that “[e]vidence of longstanding ownership, coupled with sentimental or emotional interests in the property, may also be considered in deciding whether the interests of the party opposing the sale will be prejudiced by the property’s sale”).

⁹⁹ See, e.g., Daniel B. Klein & John Robinson, *Property: A Bundle of Rights? Prologue to the Property Symposium*, 8 ECON. J. WATCH 193 (2011) (providing a concise overview of the history of the phrase “bundle of rights”); Thomas W. Merrill & Henry E. Smith, *What Happened to Property in Law and Economics?*, 111 YALE L.J. 357, 365-66 (2001) (discussing the role of the bundle of rights model in the thinking of the legal realists and law and economics scholars); Robert C. Ellickson, *Two Cheers for the Bundle-of-Sticks Metaphor, Three Cheers for Merrill and Smith*, 8 ECON. J. WATCH 215, 215 (2011) (noting the history of the “only slightly less popular metaphor” of a “bundle of sticks”). An influential early proponent of the “bundle of rights” metaphor was John Commons. See JOHN R. COMMONS, THE DISTRIBUTION OF WEALTH 92 (1893); Katherine V.W. Stone, *John R.*

attack for its alleged implicit suggestion that property lacks a stable core, and that it comprises nothing more than a loosely assembled and endlessly disaggregable pile of use rights.¹⁰⁰ The question of whether property is, should be, or must be treated as an indivisible lump has played a prominent if not always fully articulated role in the ensuing debates.¹⁰¹ Robert Ellickson captures the possibility that property might be a step good when, channeling Michael Heller, he analogizes rights in property to playing cards in a deck—a package of complementary elements that become next to worthless if even one is missing.¹⁰²

Is property really a step good constructed of such strongly complementary elements that removing one will cause a cataclysmic loss of value? One difficulty lies in figuring out exactly what the sticks in the bundle represent.¹⁰³ Sometimes they are described as use rights, with different twigs representing, say, the right to build a house, to emit smoke, to grow tall trees, to play pinochle, to turn somersaults on the lawn, and so on.¹⁰⁴ Sometimes the sticks are described as different facets of the ownership interest, so that twigs represent the right to alienate, to devise, to destroy, to use, and to exclude,¹⁰⁵ or as the Hohfeldian units into which these incidents of ownership might be subdivided.¹⁰⁶ Sometimes they are taken to mean the interests into which a fee estate might be disaggregated, such as leaseholds, life estates, and easements.¹⁰⁷ They might even be understood as representing rights against all the other people in the world, so that the twigs might be property rights enforceable against Paul, property rights enforceable against Kita, property rights enforceable against Oswald, and so on until the name of every person on the planet has been listed, save the owner's.¹⁰⁸ And, of course, all these elements can be combined in innumerable ways (the right to sell pinochle-playing rights to Alex, the right

Commons and the Origins of Legal Realism; Or, The Other Tragedy of the Commons, in 2 TRANSFORMATIONS IN AMERICAN LEGAL HISTORY 326, 331-32 (Daniel W. Hamilton and Alfred L. Brophy, eds. 2010).

¹⁰⁰ There have been other attacks on the metaphor stemming from different sets of concerns. See, e.g., Jeanne Schroeder, *Chix Nix Bundle-o-Stix: A Feminist Critique of the Disaggregation of Property*, 93 MICH. L. REV. 239 (1994).

¹⁰¹ The state of play can be inferred from a recent symposium devoted entirely to the bundle of rights metaphor. Symposium, *Property: A Bundle of Rights?* 8(3) ECON. J. WATCH (2011).

¹⁰² Ellickson, *supra* note 99, at 218.

¹⁰³ For discussion of the many ways the bundle metaphor might be understood, see James E. Penner, *The "Bundle of Rights" Picture of Property*, 43 UCLA L. REV. 711 (1996). Thomas Merrill flags a related problem in interpreting the Supreme Court's use of the metaphor—"how to distinguish between a horizontal stick and a lateral chop" through every stick—where the latter but not the former is understood to be a compensable taking. Thomas W. Merrill, *The Property Prism*, 8 ECON. J. WATCH 247, 248 (2011).

¹⁰⁴ See Penner, *supra* note 103, at 734.

¹⁰⁵ See Tony Honoré, *Ownership*, in MAKING LAW BIND: ESSAYS LEGAL AND PHILOSOPHICAL 161 (1987) (enumerating eleven incidents of ownership).

¹⁰⁶ See Penner, *supra* note 103, at 724-38 (examining the relationship between Hohfeld and Honoré's work and the "bundle of rights" view of property) (citing and discussing WESLEY N. HOHFELD, FUNDAMENTAL LEGAL CONCEPTIONS AS APPLIED IN JUDICIAL REASONING AND OTHER LEGAL ESSAYS (Walter W. Cook ed., 1923)).

¹⁰⁷ See, e.g., Ellickson, *supra* note 99, at 216-17.

¹⁰⁸ See Penner, *supra* note 103, at 757-59.

to exclude Josephine from the front lawn on Tuesdays, the right to emit smoke in the direction of Tess when the wind blows from the southwest, and so on) to create a very large bundle of very small sticks.¹⁰⁹

Viewed at this level of specificity, it seems absurd to suggest that removing one element would always or even very often render property valueless. On the contrary, owners transact over these rights (and much larger ones) all the time without ceasing to be owners. However, a weaker but more convincing claim can be made about agglomeration effects among rights that would keep aggregation and disaggregation from being a zero-sum game.¹¹⁰ There is also an information story in play: it may be impossible for a nonowner or governmental entity to ascertain the effects of removing a given twig of value, based on an analysis of that twig alone. This fits with the idea that property is designed to group together complementary elements in ways that are intentionally opaque to outsiders and that make inquiry into the interrelationship among the pieces of the owners' holdings unnecessary.¹¹¹

But the argument from complementarity proves too much. In a complex society, complementarities exist both within and between owners' holdings. The bundle of rights image of property, with its general inattention to the power of aggregation, can offer no way to test the strength of within- and between-property complementarities. But, importantly, neither can a vision of property that treats it as a lumpy and irreducible whole. Manifestly, it is not: incursions into owners' prerogatives are made regularly.¹¹² What is needed, and what is lacking in existing accounts of property, is a way to gain analytical traction on the choices that must be made among competing aggregations.

Another facet of the debate between critics and defenders of the bundle metaphor goes to the mutability and social contingency of property packages. Suppose we accept that certain entitlement packages currently tend to be more valuable for participants in a property system. We would then want to know whether these property configurations hold greater value due to some underlying fact of the matter. Indeed, we might go further and ask whether property has some inherent pre-political or natural unity that,

¹⁰⁹ See *id.* at 758 (observing that “it boggles the mind to suppose that [the bundle] includes actual rights permitting every-one else to do everything with the property, each of which can be transferred to the proper person at will”).

¹¹⁰ See Ellickson, *supra* note 99, at 217-18; Henry E. Smith, *Property is Not Just a Bundle of Rights*, 8 *ECON. J. WATCH* 279, 286 (2011). Disaggregation as well as aggregation can add value. Ellickson provides the colorful example of “a wholesale lot of rabbits’ feet” as an example of a good that becomes more valuable when disaggregated—apparently due to the rapidly declining marginal utility of such good luck charms. Ellickson, *supra* note 99, at 218.

¹¹¹ See, e.g., Henry E. Smith, *Community and Custom in Property*, 10 *THEORETICAL INQ. L.* 5, 17 (2009).

¹¹² See GREGORY ALEXANDER & EDUARDO M. PEÑALVER, *AN INTRODUCTION TO PROPERTY THEORY*, ch. 7, manuscript at 9 (forthcoming 2012) (describing the right to exclude as “pock-marked . . . with exceptions”).

although it can be split up by humans, retains a recognizable form.¹¹³ Or are lumps largely of our own making? If the strong complementarity that makes us draw property lines *here* and not *there* is contingent on social, cultural, and technological factors, rebundling may become necessary as conditions change. Continuing to recognize property as a bundle makes the enterprise of rebundling easier to contemplate and accomplish—for better or worse.¹¹⁴

B. Exclusion, Obligation, Aggregation

Positioning itself in opposition to economic or welfarist accounts of property, a “progressive property” school has recently emerged to argue that property should be informed by a wider range of human values, including virtue, social obligation, and democracy.¹¹⁵ Among other things, proponents of this approach have questioned the dominance given to exclusion in current understandings of property.¹¹⁶ These arguments have been met with predictable pushback from scholars who view exclusion as a core defining feature of property.¹¹⁷ Meanwhile, many law and economics scholars eschew hard exclusion rights in favor of softer liability rules that facilitate the movement of resources to higher valuing users. These disagreements, I suggest, can be reframed as debates over competing indivisibilities.

Consider again the exclusion theorists’ objection to the bundle of sticks metaphor on the grounds that it is unduly sensitive to the complementarities embedded in individual property holdings. Their approach takes as a given

¹¹³ Carol Rose’s metaphor for property that is protected by a property rule—“the whole meatball”—would seem to suggest as much. Carol M. Rose, *The Shadow of The Cathedral*, 106 YALE L.J. 2175, 2178-79 (1997). She observes that the meatball can be split into pieces, as through liability rules, but she nonetheless treats the meatball itself as the salient unit of analysis. A different approach would recognize entitlements as a type of stuff that can be sliced thick or thin; we would not need to conceptually identify it with other pieces that have been granted to other parties. I thank Henry Smith for raising Rose’s meatball analogy.

¹¹⁴ For some sticks critics, that very ease of rebundling is cause for concern and an independent reason to oppose the sticks metaphor. Such critics worry that the metaphor gives the government too much leeway to reconfigure property rights without compensation. See, e.g., Klein & Robinson, *supra* note 91, at 195 (arguing that “[c]haracterizing property as a ‘bundle of rights’ would make government intervention, not the violating of property, but rather the rearranging or redefining of the bundle”). Richard Epstein has argued for the opposite position, on the grounds that each stick has value and recognizing it as a discrete interest could (in theory) support compensation if it is taken away. Richard A. Epstein, *Bundle-of-Rights Theory as Bulwark Against Statist Conceptions of Private Property*, 8 ECON. J. WATCH 223,233 (2011); see also Radin, *supra* note 82, at 1678 (noting that conceptual severance leads to “an easy slippery slope to the radical Epstein position” in which “[e]very curtailment of any of the liberal indicia of property, every regulation of any portion of an owner’s ‘bundle of sticks,’ is a taking of the whole of that particular portion considered separately”).

¹¹⁵ See Gregory S. Alexander, Eduardo M. Peñalver, Joseph William Singer, & Laura Underkuffler, *A Statement of Progressive Property*, 94 CORNELL L. REV. 743 (2009); Gregory S. Alexander, *Pluralism and Property*, 80 FORDHAM L. REV. (forthcoming) available at <http://ssrn.com/abstract=1974573>. For a good summary and critique of the movement, and the different strands within it, see Ezra Rosser, *The Ambition and Transformative Potential Of Progressive Property*, unpublished manuscript (Fall 2011 draft).

¹¹⁶ See, e.g., Alexander, *supra* note 115, at 107 (noting the significance of “a theorist’s position on the right to exclude”); Rosser, *supra* note 115, at 41 (“A call for a reconsideration of the centrality of the right to exclude in property law is perhaps the dominant theme of progressive property scholarship.”)

¹¹⁷ See, e.g., Henry E. Smith, *Mind the Gap: The Indirect Relation Between Means and Ends in American Property Law*, 94 CORNELL L. REV. 959 (2009).

the blocky chunks of control that property has historically given owners. Interfering with what seems to be a minor twig, we are warned, could upend the owner's plans and projects in ways we cannot foresee. The point resonates: who are we to decide what rights the owner can and cannot do without, or to predict the intricate and subtle interweaving of entitlements that lies inside the owner's block of control? Yet those same blocks of control can quietly preclude the assembly of larger-scale sets of rights that might well be interwoven in much the same way. If we were to begin with a particular community-owned assembly of rights in place, the same "take a twig, ruin the whole" argument could cut against conferring the rights in question on individual owners. The notion of complementarities is a robust one, but it is double-edged in the property context. Private property can block as well as embody complementarities.

The fact that discontinuities and complementarities often stand on both sides of an interaction presents real challenges for property law. Households may get disproportionate amounts of utility from having unlimited tenure length (even if they don't actually stay forever), yet truncating tenure (and hence breaking up one valuable lump) can be instrumental to forming valuable spatial lumps, as through eminent domain. Similarly, partition in kind facilitates lumpiness in one direction (time of tenure) but truncates it in another (space). Exclusion rights respect the supposed lumpiness of an owner's holdings by refusing to allow even small encroachments, but hard exclusion rights also prevent valuable aggregations from being formed across a set of properties. If aggregating on one dimension means splintering along another, we might ask whether lumpiness on one or the other of these dimensions should get more deference, and why. And here we see different property theorists coming up with different answers.

The progressive property movement urges greater attention to the value of long temporal lumps and collective social, cultural, distributive, and deliberative projects that require the aggregate participation of owners. Exclusion theorists focus on the parcel or thing itself as a lump, the forcible breaking open of which violates the integrity of the holding. The chunkiness of owner-initiated changes to default exclusion rights offers one example. Everyone agrees that once an owner opens her gate to allow in the general public, she cannot then turn around and exclude segments of the public based on protected characteristics.¹¹⁸ But other questions remain about the extent to which an owner should be able to open her gate in owner-specified degrees. The lumpiness of broader normative commitments of society is implicated in these debates. To take the easiest case, if uniform application of antidiscrimination norms across communities and nations is necessary to

¹¹⁸ See Joseph William Singer, *No Right To Exclude: Public Accommodations and Private Property*, 90 NW. U. L. REV. 1283, 1457-58 (1996).

produce results that tend toward equality, then allowing owners to parcel out access rights just as they please would interfere with that aggregation.¹¹⁹

No doubt progressive property scholars would resist my attempt to boil down all of property's core debates to a question of production functions and nonlinearities.¹²⁰ Nonetheless, putting things in those terms offers a way for proponents of different approaches to understand each other's concerns. It may seem a simple matter for an owner to give up part of what she has in the name of social obligation, but if having "nearly all" is dramatically less valuable than having "all," her resistance can be better understood. Likewise, if a given social obligation is viewed as part of an aggregation that may be difficult to achieve through uncoordinated action, the interest in achieving it coercively through a reconceptualization of property may make sense in a way that resonates with law and economics scholars.

Nobody now disputes the normative correctness of the law's choice to accommodate ownership to plane travel by overriding hard exclusion rights above a certain height, nor of its commitment to enforcing antidiscrimination norms against private landowners. Casting other social projects as of a piece with those famous aggregations may be more controversial, but at least the controversy will be centered in an analytically useful place.¹²¹

IV. LEARNING FROM LUMPINESS

The issues of lumpiness raised in this essay interact with fundamental questions about choice and coercion in property arrangements. Viewing these problems through the lens of lumpiness offers useful analytic guidance.

A. *Empty and Constructed Lumps*

I have emphasized throughout that many property doctrines are descriptively lumpy. It is a separate question whether the legally constructed discontinuities track underlying indivisibilities in consumption or production. Doctrines that make property law chunky may create or

¹¹⁹ Analogous points have been raised in the context of applying subsidiarity principles to natural resources. See Graham Marshall, *Nesting, Subsidiarity, and Community-based Environmental Governance Beyond the Local Level*, 2 INT'L J. COMMONS 75, 78 (2008) (noting problems, including discrimination, requiring the involvement of higher levels of government).

¹²⁰ Nonetheless, it is interesting indeed that Gregory Alexander, one of the primary proponents of the "progressive" or "social obligation" school of property, has recently invoked Charles Taylor's notion of "complementarity"—among aspects of an individual's life—in discussing a pluralistic, social obligation vision of property. See Alexander, *supra* note 115, at 132-33 (citing Charles Taylor, *Leading a Life*, in INCOMMENSURABILITY, INCOMPARABILITY, AND PRACTICAL REASON 170, 178-82 (Ruth Chang, ed., 1997)).

¹²¹ See *infra* Part IV.C (discussing choices among lumps).

entrench a lumpiness that would not otherwise be present, or they may sustain a lumpiness that is no longer empirically backed up by the way property is produced or consumed. Where this is the case, we should at least consider the possibility of “unchunking” property law along the dimension on which it currently displays chunkiness.¹²²

It is easy to appreciate the potential costs of such a move, which may cash out in confusion, complexity, destabilization of expectations, administrative toil, and overall hassle. But there are costs on the other side as well. Lumps are not always benign. Not only may they rule out choices that some parties might highly value, they can also keep society from even gathering information about preferences for interstitial goods. Some doctrinal lumps make societal choices less sensitive to behavioral inputs than might be optimal, while others, such as those in the takings realm, may misdirect coercive force. Recognizing the lumpy structure of property law and examining its underpinnings has value, even if one feels certain that the status quo is optimal. Unless we are convinced that property law should be immutable, it is important to understand what features of the status quo make the existing architecture sensible and which changes in empirical conditions would render it less sensible.

A central problem is that we often lack information about private valuations of elements in various property packages, much less good data on how that value grows or shrinks as a function of the aggregation or disaggregation of entitlements. Finding ways to let owners and nonowners supply information that credibly speaks to the question of complementarity offers one alternative. I have argued elsewhere that the law could be involved in providing platforms for eliciting just this sort of information.¹²³ Given the degree to which property’s value as a social institution depends on getting aggregations right, we should be interested in finding mechanisms that can improve its performance on this dimension.

We may also wonder to what degree the law itself, and its various decisions to entrench, accommodate, or ignore certain concerns, encourages people to recognize and value certain lumps *as* lumps.¹²⁴ For example, does the law’s enforcement of discontinuities at the property’s edges entrench a notion of property as an inviolable thing? If so, does this entrenchment make property lines more focal for owners than they otherwise would be,

¹²² Proposals to “continuize” the law have been advanced in a variety of doctrinal areas. See KATZ, *supra* note 94, at 145-51. The unchunking I refer to here bears a family resemblance to proposals that attempt to break down doctrinal notches or cliffs in favor of making law more responsive to an underlying continuous variable, such as degrees of certainty or culpability.

¹²³ See, e.g., Lee Anne Fennell, *Property and Precaution*, 4(2) J. TORT L., art. 3 (2011) (proposing an option system that would induce low-valuing holders of certain entitlements to self-identify).

¹²⁴ See, e.g., Steven R. Munzer, *A Bundle Theorist Holds On to His Collection of Sticks*, 8 ECON. J. WATCH 265, 268-69 (2011) (critiquing Merrill & Smith’s account of property as “discrete assets” on the grounds that it “encompasses only valued resources that a given legal system and a given community of economic actors already recognize”).

hardening the parcel-as-lump in ways that make larger aggregations more difficult and costly?¹²⁵ To take another example, when landlord-tenant law specifies what society views as the appropriate minimum bundle of quality, space, and tenure length, it may also influence expectations about what constitutes a “home” in ways that tend to reinforce the legally mandated minimum bundle. The possibility that law is not merely responding to but also shaping the chunks in which property delivers utility presents interesting challenges when it comes to applying coercion in defense or pursuit of lumps, or choosing between lumps of value.

B. Compelling Lumps

Lumpiness usually goes unnoticed. We buy tires for our cars in sets of four, shoes in sets of two, and complete rather than partial houses, all without ever remarking on the complementarities or indivisibilities involved. When and why must law get involved?

The literature on the production of lumpy public goods offers a starting point.¹²⁶ If we need everyone to contribute a bridge segment or we will not manage to span the gap, then it becomes necessary to coordinate behavior. Depending on the number of contributors, the number of necessary segments, and the associated individual and group payoffs, the collective action problem may take any number of forms.¹²⁷ Such collective action problems are not unique to lumpy goods, although the step nature of the bridge does change the nature of the strategic interaction.¹²⁸ The potential sticking point is that many of the benefits of individual contributions will be externalized to the rest of the group if the bridge is (within the relevant group) nonrival and nonexcludable.¹²⁹ Public provision is not invariably required in such cases,¹³⁰ but the collective action problems associated with public goods provide a familiar rationale for coercion.¹³¹

¹²⁵ See generally Nash & Stern, *supra* note 86.

¹²⁶ See, e.g., HARDIN, *supra* note 1, at 55-61; Taylor & Ward, *supra* note 5; Hampton, *supra* note 6.

¹²⁷ See, e.g., Taylor & Ward, *supra* note 5, at 353-54.

¹²⁸ See, e.g., LEVI, *supra* note 10, at 57 (observing that “lumpy goods certainly affect individual strategy”); Hampton, *supra* note 6, at 259-72 (examining the strategic interactions associated with step goods and incremental goods, respectively). Public goods with more linear qualities (such as landscaping that may be added to a public thoroughfare in any amount) generate somewhat different collective action problems. A linear production function will often produce a Prisoner’s Dilemma in which each party will prefer not to contribute, regardless of what everyone else does. An exception to this rule applies if each person’s contribution generates marginal returns that are so large that the person herself is made better off even if nobody else contributes. See Oliver et al., *supra* note 11, at 533-34 (explaining that, depending on the slope, a linear production function will induce every player to “contribute either everything possible or nothing”); Fennell, *supra* note 11, at 956-58 (discussing this point and providing examples).

¹²⁹ In other words, the bridge has the characteristics of a local public good. See RICHARD CORNES & TODD SANDLER, *THE THEORY OF EXTERNALITIES, PUBLIC GOODS, AND CLUB GOODS* 32-33 (2d ed. 1996).

¹³⁰ See, e.g., R.H. Coase, *The Lighthouse in Economics*, 17 J. L. & ECON. 357 (1974).

¹³¹ Coercion might be applied even where the good is not publicly provided; those who enjoy the benefits of a particular good might simply be required to reimburse the provider. See generally Ariel Porat, *Private Production of Public Goods: Liability for Unrequested Benefits*, 108 MICH. L. REV. 189 (2009).

Suppose instead that we have a private party who is ready to construct a toll bridge, and who needs only to buy segments from the various individuals holding them. Here, too, we may face a problem that requires compulsion. If all the bridge segments are necessary, unique, and unavailable other than from the specific individuals who now hold them, there may be a severe holdout problem. If, instead, there are n segment-holders and $n-1$ necessary segments, the problem is eased considerably. Indeed, each owner might hurry to avoid being the one whose segment is left out of the assembly, rather than striving to be the last holdout, especially if the bridge segments hold little intrinsic value for their owners. Thus, compulsion may become unnecessary, even when goods are lumpy, if there is some degree of competition among input-providers or if the inputs are not strictly complementary.¹³² This point has obvious applications to the exercise of eminent domain.

Property lumps might also be compelled by the government because of its own production efficiencies or to safeguard consumption utility where individuals will have difficulty doing so for themselves. Consider first production efficiencies. If property came in just four standard flavors because of the high start-up costs to the government of inventing and specifying new property forms, customization post-production would not be a problem. It would be no different than a consumer of a Model T painting her car yellow after she buys it. But if there are ongoing costs that the government bears as a continuing producer of property law—and these cannot be easily left to fall on the customizer¹³³—then coercion in the name of cost savings might seem justified. Yet we would need to know more. Where private decisions impose public costs, a prohibition is only one possibility, and often not the most efficient one.

We might wonder, for example, whether Pigouvian taxes for property customization would be an alternative, if we thought that customizations made the property system marginally more difficult for the government to operate in ways that the customizer did not internalize.¹³⁴ Pigouvian taxes might work well if customizations merely added some degree of incremental strain to a system, as by marginally increasing the workload associated with recording and tracking interests in land.¹³⁵ But taxes are not

¹³² For exploration of some of these issues, see Kominers & Weyl, *supra* note 71.

¹³³ The analog in the private context might be a car manufacturer who voids the warranty of any consumer who modifies the vehicle, on the ground that this raises the costs of keeping the vehicle in running order.

¹³⁴ Pigouvian taxes (and subsidies) seek to align private payoffs with social ones by internalizing externalities. See A.C. PIGOU, *THE ECONOMICS OF WELFARE* 172-203 (4th ed. 1932); see also Maureen L. Cropper & Wallace E. Oates, *Environmental Economics: A Survey*, 30 J. ECON. LIT. 675, 680 (1992) (defining Pigouvian taxes).

¹³⁵ In fact, the U.S. system of land recordation largely privatizes the costs of tracking interests in land, as through the work of title insurance companies. The fact that much of the public good of keeping titles straight is privately produced does not alter the analysis, though it does affect the distributive impact of any externalities that customizations produce.

likely to be a suitable response if each new tweak will require a large, discontinuous input (a new full-time worker, say) which will then leave a standing supply of excess capacity in treating that particular variation. If the problem is not with maintaining new property forms as such, but with getting lots of people to agree on the *same* new forms, the law might take the lead in offering platforms for coordinating their launch.¹³⁶

Similar problems of coordination may exist on the consumption utility side of the equation. Suppose we accept an extreme account of informational externalities in which an isolated act of customization by a single owner can wreak havoc on an entire property system, yet a new property form that is adopted by a significant segment of the population can be accommodated.¹³⁷ Or to generalize the point, suppose that part of what gives certain packages of property value (for both owners and non-owners) is the fact that many other people are consuming the same packages. If these conditions hold, there may be a second-order lumpy good in the picture, in addition to the lumpy property package itself: the public good of having a network of consumption patterns that exhibit certain kinds of uniformity. The question then becomes whether and why compulsion might be necessary to achieve this public good.

Setting a property menu might on one account be a pure coordination game, akin to deciding on which side of the road to drive; nobody has any independent preference on the matter but only wishes to select the same choice as everyone else.¹³⁸ In such cases, the law can perform an important coordination function by making a particular choice focal; enforcement is generally unnecessary, because it is in everyone's interest to comply.¹³⁹ A somewhat different story is presented if people have different preferences about what to consume, notwithstanding their overriding preference to consume the same thing.¹⁴⁰ Here, settling on a single package (or limited set of packages) will require not just coordination, but also substantive concessions by at least some players. In the property context, the law's insistence on a limited menu might operate like an in-kind tax system that

¹³⁶ A small but illustrative analogue can be found in Department of Motor Vehicles offices that let customers conditionally commit to purchase a new license plate design—one that will be produced only if enough others commit to that same design. The author participated in a successful scheme of this sort when Maryland introduced an “Animal Friendly” license plate in the 1990’s. The DMV collected checks from those willing to purchase the new plate, promising either to return the check uncashed (if insufficient amounts were collected to support the new design) or to deliver the new plate itself.

¹³⁷ This is a hyperbolized version of the account adopted by Merrill and Smith. See Merrill & Smith, *supra* note 51, at 47 (“The one out of one hundred who adopts a nonstandard form for property rights can increase the costs of processing the rights of ninety-nine others.”); *id.* at 40 (observing that the *numerus clausus* principle does allow new property forms to be legislatively created, and thus “permits some positive level of diversification in the recognized forms of property”).

¹³⁸ See Richard H. McAdams, *A Focal Point Theory of Expressive Law*, 86 VA. L. REV. 1649, 1667 (2000).

¹³⁹ *Id.* at 1667-68.

¹⁴⁰ The game theoretic paradigm for this situation is “The Battle of the Sexes,” in which a couple has an overriding desire to spend an evening out together, but each member of the couple has a different preferred form of entertainment. See, e.g., *id.* at 1672-73 & n.56.

compels each person to contribute their “frustration costs”¹⁴¹ to the larger good of uniformity.

A further inquiry is whether this uniformity is worth the cost of these compelled inputs—and, even if so, whether we could achieve it at a lower frustration price by recalibrating the menu to include different, or more, entries. These questions bring us back to the problems of demand revelation that plague the provision of public goods. The Tiebout hypothesis famously offers a non-market mechanism for eliciting information about public goods and services—jurisdictional variation.¹⁴² Tiebout’s insight may have interesting implications here, to the extent that some of the benefits of uniformity can be achieved at a relatively small scale. For example, if social or political benefits were thought to flow from everyone in a given neighborhood or private community holding the same tenure form, local variation capable of inducing localized sorting could achieve small-scale uniformity without requiring a fixed tenure menu at the state level.¹⁴³

C. Choosing Lumps

The analysis to this point has already emphasized that property law must often choose between competing assemblages; I offer here a few brief thoughts on how the task might be approached. Most fundamentally, choosing among competing chunks requires knowing which sets of entitlements stack together in a highly complementary way and which do not. In other words, it requires knowing something about the relevant production functions. Sometimes the degree of complementarity simply informs (or explains) how a single owner of the relevant inputs will choose between possible ways of aggregating those inputs. If bridges are being made by a governmental entity that has only a certain number of linear feet of bridge material, we will understand why it will choose to allocate those linear feet to the production of complete rather than partial bridges (or will have cause to complain if it fails to do so).

If different parties own the necessary inputs, however, they must be convinced (or coerced) to contribute them to valuable aggregations. Where strict complementarity is present, the strategic holdout problem may be so severe as to make some form of coercion unavoidable. The use of coercion to create a valuable assembly, however, must always grapple with

¹⁴¹ See Merrill & Smith, *supra* note 51, at 35-38.

¹⁴² See Charles M. Tiebout, *A Pure Theory of Local Expenditures*, 64 J. POLIT. ECON. 416 (1956).

¹⁴³ This example brackets many important normative and empirical questions—including the possibility that sorting along tenure lines could impede other valuable aggregations, such as the production of desirable housing patterns across income lines. The idea that other aspects of property law might be varied locally to induce Tieboutian sorting was advanced in Christopher Serkin, *Local Property Law: Adjusting the Scale of Property Protection*, 107 COLUM. L. REV. 883 (2007).

uncertainty about the private valuations of the separate inputs—that is, with the possibility that the assembly does not generate surplus after all. A variety of mechanisms have been discussed in the literature for eliciting better valuation information from owners, and I will not revisit the arguments for and against those approaches here. One component of the valuation story deserves independent attention, however: private valuations may exceed market values as a result of other, identifiable aggregations that are already in the picture.

Consider a land assembly that would break up a neighborhood, or that would interrupt a lengthy period of possession for one or more occupants. If most people value possession of a home in a fairly linear way, enjoying a stream of benefits in each year that is untouched by whether the number of years is few or many, then ending possession abruptly will not do disproportionate harm. Likewise, if the social benefits in a neighborhood are accrued block by block in a modular manner that does not depend on the existence of neighboring blocks, then carving away part of the neighborhood (as long as blocks are left intact) will do little harm. If, however, the production functions take different forms, the problem becomes a complicated one in which the value added by a coercive spatial aggregation must be compared with the surplus that will be lost by coercively breaking up other aggregations.¹⁴⁴ Even small changes in assumptions about complementarity can make large differences. For example, if we soften the assumption of strict complementarity for the spatial aggregation—suppose the project will deliver most of its value if 80% of the available pieces are supplied—then the nature of the collective action problem changes dramatically and, potentially, the need for coercion.

Although normative judgments are an unavoidable part of making choices among lumps, empirical judgments about valuations are central to the inquiry as well. Finding mechanisms for collecting information about the likely shape of the production functions at issue should be an important focus for empirical work.¹⁴⁵ We must also confront the possibility that the law itself may influence how various aggregations are valued, and the related potential that legal changes could reshape those valuations.¹⁴⁶

¹⁴⁴ For exploration of some of the issues associated with community aggregations and eminent domain, see Parchomovsky & Siegelman, *supra* note 4.

¹⁴⁵ For example, Stephanie Stern has recently noted the relative dearth of psychological evidence indicating that people who are displaced from their homes suffer a dire and lasting welfare loss—contrary to the strong assumptions that have been employed by many legal scholars and social commentators. Stephanie M. Stern, *Residential Protectionism and the Legal Mythology of Home*, 107 MICH. L. REV. 1093, 1109-19 (2009).

¹⁴⁶ Jonathan Nash and Stephanie Stern have empirically investigated the degree to which the framing of ownership as bundles or as “discrete assets” influences attitudes toward entitlements, and have suggested that the law might consciously craft property conceptualizations to modulate the strength of ownership claims. Nash & Stern, *supra* note 86. Cf. Ian Ayres & Eric Talley, *Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade*, 104 YALE L.J. 1027, 1102 (1995) (positing that endowment effects might be weaker in a liability rule regime); Jeffrey J. Rachlinski & Forest Jourden, *Remedies and the Psychology of Ownership*, 51

Conclusion

Legal theory has largely neglected the role of lumpy or discontinuous production functions. This omission is particularly striking in the field of property, given the institution's doctrinal and conceptual focus on things as indivisible repositories of value. This essay has sketched how lumpiness matters for property law, and has considered some of the doctrinal and theoretical implications of explicitly recognizing this aspect of property's architecture. It has also raised questions about the mutability and desirability of lumpy thinking in property law and theory.

A particular concern is whether some aspects of property's lumpiness are historical artifacts that no longer correspond to what is most valuable about the institution for those who use it. Leaving lumps alone is not costless, especially where the chunks that make up individual property holdings conflict with other aggregations that society may wish to undertake at a broader scale. Indeed, some of property's most important conflicts can be usefully most framed as lump versus lump. Explicitly framing things in this way makes clear that the question is not so much whether property will be lumpy but rather how it will be lumpy.

I must leave to future work a fuller explication of these points, as well as a wider look at the significance of lumpiness for law across other doctrinal areas. I hope, however, that the chunk of analysis that I have taken on here forms for readers a useful lump.

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