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Partition and Revelation

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Partition and Revelation

Yun-chien Chang† *& Lee Anne Fennell*††

INTRODUCTION

Although property ownership is prototypically associated with a single owner, land is very often co-owned. When things go wrong among co-owners, the law has a built-in escape hatch: partition. Co-tenants [1] can partition the co-owned properties through voluntary agreement, or any co-tenant may petition a court for partitioning.[2] All jurisdictions we know require unanimity for the former but design the latter petition right to be unilateral.[3] Partition may be either in kind (the land is physically divided up), by sale, or through some combination of these methods.[4] Regardless of the method chosen, the judicial partition process operates coercively as to at least some of the

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1 We will use the terms "co-owners" and "co-tenants" interchangeably to refer to holders of concurrent freehold interests, regardless of the specific form of co-ownership involved.

2 Some jurisdictions place limits on the judicial partition right, such as a requirement that voluntary partition first be sought by the parties. See Yun-chien Chang and Lee Anne Fennell, *Appendices to* Partition and Revelation, 81 U Chi L Rev Dialogue 1, 1–4 (2014), online at https://lawreview.uchicago.edu/page/chang-fennell (Appendix A).

3 See id.

4 See Jesse Dukeminier, et al, *Property* 345–46 (Aspen 7th ed 2010) (examining judicial choices among partition methods).

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co-tenants. It thus implicates problems of value revelation akin to those raised by other coercive land transfers, such as eminent domain. Indeed, despite receiving relatively little scholarly attention, revelation in the co-ownership context raises a set of questions that are in some ways richer and more interesting than those presented by government condemnation.

Existing economic analyses of partition have primarily examined whether partition by sale or partition in kind is more efficient, with a strong emphasis on balancing economies of scale against subjective attachments to the land.[5] In this Article, we focus on two aspects of the problem that have been neglected in earlier treatments. First, we consider the implications of different judicial partition procedures on the bargaining dynamics that precede resorting to judicial partition.[6] Second, we consider the potential impacts on efficiency of intermediate and partial forms of partition, which are prevalent in practice. Considered together, these two branches of our analysis show how more accurate revelation mechanisms might play a role in advancing the efficiency of co-ownership.

One interesting and counterintuitive result of our analysis is that the goal of incentivizing efficient pre-partition behavior may be in some tension with the goal of seeking efficiency in the partition process itself. Perfect auction mechanisms that force parties to reveal subjective valuations in the judicial partition context could alter the negotiation dynamic in ways that make voluntary partition less likely. As a result, better revelation mechanisms may not always yield better outcomes. The challenge is to design partition approaches that allow subjective values to be taken into account in deciding how to partition property without encouraging socially wasteful struggles over surplus in earlier periods. A useful partition approach must also deal

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[5] See Part I.A. Scholars have also investigated the existence and magnitude of discounts associated with different judicial sales procedures. See Chang and Fennell, 81 U Chi L Rev Dialogue at 4–6 (cited in note 2) (Appendix B).

[6] Our focus on ex ante effects parallels that in Lucian Arye Bebchuk, *Property Rights and Liability Rules: The Ex Ante View of the Cathedral*, 100 Mich L Rev 601 (2001). We are not the first to note the potential influence of judicial partition rules on bargaining dynamics. See, for example, Sarah E. Waldeck, *Rethinking the Intersection of Inheritance and the Law of Tenancy in Common*, 87 Notre Dame L Rev 737, 753–54 (2011). One element that we do not examine is the role of court delays in generating bargaining leverage for co-tenants independent of the substantive rule that will be (eventually) applied. See generally Manel Baucells and Steven A. Lippman, *Justice Delayed Is Justice Denied: A Cooperative Game Theoretic Analysis of Hold-up in Co-ownership*, 22 Cardozo L Rev 1191 (2001).

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reasonably well with the liquidity and coordination shortfalls that can hamper revelation of value in the co-ownership context.

Because partition design features that advance some efficiency goals impede others, we cannot determine the best approach without additional research—both empirical studies and formal theoretical modeling.[7] We can say with some confidence that no first-best partition solution is achievable under real-world conditions. At the same time, we see significant room for improvement over the status quo. Our goal in this Article is to lay out the considerations relevant to the choice of a new partition mechanism.

This Article proceeds in two parts. Part I critically reviews the prior literature on the relative efficiency of partition in kind and partition by sale by focusing on two areas of neglect: the bargaining problem faced by co-tenants under the shadow of different judicial partition rules, and the role of intermediate partition approaches in addressing liquidity and coordination shortfalls. Part II considers possible ways to improve partition rules by attending to these concerns.

Our analysis here will be limited in three respects. First, we will focus only on partition as it applies to possessory interests in real property. Second, we will largely abstract away from doctrinal detail to generate a stylized account of the efficiency implications of different approaches.[8] Third, although we will consider the localized distributive effects of different partition rules insofar as those effects influence pre-partition bargaining and value revelation, our treatment will necessarily leave unaddressed many important normative and empirical questions surrounding the distributive effects of partition rules.[9]

I. BEYOND A BINARY EX POST ANALYSIS

If the co-owners who wish to end their co-ownership relationship can arrive at a voluntary partition agreement, they will

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[7] For a modeling approach to a similar division problem, see generally Peter Cramton, Robert Gibbons, and Paul Klemperer, *Dissolving a Partnership Efficiently*, 55 Econometrica 615 (1987).

[8] Our analysis is nonetheless informed by our comparative findings, which are compiled in Appendix A. See Chang and Fennell, 81 U Chi L Rev Dialogue at 1–4 (cited in note 2). We will refer at times to the practices of particular jurisdictions.

[9] See generally, for example, Phyliss Craig-Taylor, *Through a Colored Looking Glass: A View of Judicial Partition, Family Land Loss, and Rule Setting*, 78 Wash U L Q 737 (2000); Thomas W. Mitchell, Stephen Malpezzi, and Richard K. Green, *Forced Sale Risk: Class, Race, and the "Double Discount,"* 37 Fla St U L Rev 589 (2010).

not need to seek judicial partition. One of us, using data from Taiwan, has shown that about 92.6 percent of the time, co-tenants who sought to dissolve co-ownership were able to reach an agreement to partition their co-owned interests.[10] Still, a nonnegligible portion of co-tenants cannot agree and have to rely on the court to provide a solution. Existing analyses of the judicial solution have largely approached the question from an ex post perspective, rather than considering the effects of the partition rule on pre-partition bargaining. The choice is also typically analyzed as a binary one between partition in kind and partition by sale, even though intermediate approaches can help to address liquidity and coordination problems that can impede efficient outcomes. We will start with a brief overview of the existing literature before turning to these two shortfalls.

A. Subjective Valuations and Economies of Scale

Modern jurisdictions exhibit variation as to whether partition in kind or partition by sale is preferred and as to the strength of the presumption in favor of the preferred approach.[11] Most American jurisdictions have a common law rule that purports to favor partition in kind, but scholars suggest that courts usually order partition by sale.[12] The fact that there are economies of scale associated with keeping the land intact is often the rationale for departing from the stated preference for partition in kind. The most commonly cited reason for sticking with the traditional preference for partition in kind is the subjective value that one or more of the co-tenants have in the land.[13] Similarly,

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[10] See Yun-chien Chang, *Tenancy in "Anticommons"? A Theoretical and Empirical Analysis of Co-ownership*, 4 J Legal Analysis 515, 535 (2012).

[11] For details, see Chang and Fennell, 81 U Chi L Rev Dialogue at 1–4 (cited in note 2) (Appendix A).

[12] See, for example, Dukeminier, et al, *Property* at 343–44 (cited in note 4); Mitchell, Malpezzi, and Green, 37 Fla St U L Rev at 610 (cited in note 9); William B. Stoebuck and Dale A. Whitman, *The Law of Property* 223 (West 3d ed 2000).

[13] See, for example, *Delfino v Vealencis*, 436 A2d 27, 33 (Conn 1980):

> [O]ne of the tenants in common has been in actual and exclusive possession of a portion of the property for a substantial period of time; . . . has made her home on the property; . . . [and] 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 SE2d 754, 761 (W Va 2004) (holding that the economic value of the property alone is not dispositive and that "[e]vidence of longstanding ownership, coupled with sentimental or emotional interests in the property, may also be

Article 258 of the Civil Code of Japan[14] and Article 100 of China's Property Law of 2007[15] stipulate that partition in kind, the default, can be overridden if physical division is infeasible or significantly value reducing. These prescriptions can be construed as taking into account the economy of scale.

Subjective valuation and economies of scale also feature prominently in existing economic analyses of the choice between partition rules, including the one offered by Professors Thomas Miceli and C.F. Sirmans.[16] In essence, their argument is as follows: If partition in kind does not decrease economy of scale, partition in kind is always efficient.[17] If partition in kind *does* decrease economy of scale, partition in kind is sometimes efficient because it preserves subjective value, whereas partition by sale is sometimes efficient because it prevents the fall of market value due to fragmentation.[18] To be more exact, "when the aggregate subjective value of the nonconsenting owners" is larger than the premium derived from economy of scale, partition in kind should be used.[19]

Professors Abraham Bell and Gideon Parchomovsky disagree with this analysis, favoring partition by sale across the board.[20] Their argument is that as long as co-owners participate in the auction, co-owners with high subjective values can preserve their subjective values by winning the bid.[21] Participation of co-owners with high subjective values in the auction does not ensure efficient results, however, if more than one co-owner has subjective value in the property. The key is that subjective value

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considered in deciding whether the interests of the party opposing the sale will be prejudiced by the property's sale").

[14] Civil Code of Japan Art 258, as translated in *Japanese Law Translation* (Ministry of Justice Apr 1, 2009), online at http://www.japaneselawtranslation.go.jp/law/detail/?id=2057&vm=02&re=02&new=1 (visited Mar 2, 2014).

[15] Property Law of the People's Republic of China Art 100, as translated in *Property Law of the People's Republic of China*, online at http://www.china.org.cn/china/LegislationsForm2001-2010/2011-02/11/content_21897791.htm (visited Mar 2, 2014). Note: The official translation of this statute uses the term "severance" in place of "partition."

[16] Thomas J. Miceli and C.F. Sirmans, *Partition of Real Estate; or, Breaking Up Is (Not) Hard to Do*, 29 J Legal Stud 783 (2000).

[17] Id at 789.

[18] See id at 791–92.

[19] Id at 793.

[20] See Abraham Bell and Gideon Parchomovsky, *A Theory of Property*, 90 Cornell L Rev 531, 601 (2005). See also Candace Reid, Note, *Partitions in Kind: A Preference without Favor*, 7 Cardozo L Rev 855, 878 (1986). For arguments for partition in kind, see Eric R. Claeys, *Exclusion and Exclusivity in Gridlock*, 53 Ariz L Rev 9, 36 (2011).

[21] See Bell and Parchomovsky, 90 Cornell L Rev at 601 (cited in note 20).

is idiosyncratic and nontransferable. Separate co-owners may be unable to band together to bid their joint valuations. Perhaps they are too numerous or contentious to coordinate easily, or they hold idiosyncratic attachments to different but overlapping subsets of the land.

Liquidity often presents another obstacle. In American jurisdictions, the winning bidder has to pay the auction price in cash, and many co-tenants will not be able to do it.[22] This problem could be mitigated. In Taiwan, where the winning bidder generally has to pay the auction price within five to seven days after the auction, banks provide a loan within seven days in response to this requirement.[23] Because the property's assessed value determines the amount that a bank would be willing to lend, however, speedy loans may be insufficient to enable financially constrained co-owners with idiosyncratically high subjective valuations to protect their interests in the property.

It is also worth noting that properties are often sold at a price lower than fair market value (FMV).[24] Such an auction discount does not necessarily signal inefficiency. Most likely, the initial purchaser will be a middleperson who then resells. If the ultimate purchaser is the high valuer, the only question is whether moving the property to her in two transactions rather than one adds net costs. For the reasons suggested above, however, high-valuing co-tenants may fail to end up with the property. These problems of liquidity and coordination explain why partition in kind could sometimes be more efficient than partition by sale. But, as we will see, partial partition in kind may do even better.[25]

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[22] See Michael Heller, *The Gridlock Economy: How Too Much Ownership Wrecks Markets, Stops Innovation, and Costs Lives* 122 (Basic Books 2008). See also Reid, Note, 7 Cardozo L Rev at 872 (cited in note 20) (observing that if co-owners lack the financial ability to bid in the auction, courts usually will not order partition by sale).

[23] For an example of a bank that provides this loan, see http://www.ubot.com.tw (visited Mar 2, 2014).

[24] For a review of the theoretical and empirical work on the sale of properties at auction, see Chang and Fennell, 81 U Chi L Rev Dialogue at 4–6 (cited in note 2) (Appendix B). Fair market value is "the amount that a willing buyer would pay a willing seller of the property, taking into account all possible uses to which the property might be put other than the use contemplated by the taker." David A. Dana and Thomas W. Merrill, *Property: Takings* 169–70 (Foundation 2002). We use fair market value and market value as synonyms.

[25] See Part I.C.

B. Partition's Shadow

The analysis above assumed that the efficiency of a partition rule can be evaluated based solely on the partition event itself.[26] But partition rules carry implications for earlier decisions as well.[27] We will focus on the ex ante impact of judicial partition rules on pre-partition bargaining, but it is worth noting that a series of earlier decisions, including the decision to become a co-owner or to make investments in developing subjective attachments to the land, may also be influenced by the judicial partition rule.

Central to our analysis is an understanding of judicial partition as a private taking.[28] One or more of the co-owners will be coercively dispossessed of her undivided fractional share in the property and given either land or money instead. Depending on the applicable partition rules, a co-owner might use the judicial process to "take" the property of her co-tenants for less than its value.[29] Because co-owners are also potential takees, they may engage in costly stratagems to stave off the taking or to bring it on, depending on the level of expected compensation. These concerns, well-recognized in the eminent domain context, are heightened in the partition context because the parties themselves have considerable control over whether the taking will occur and considerable insight into the compensation that will be provided in the event the taking occurs.

We view voluntary partition agreements as more desirable than judicial partition, other things equal, because they save on court costs and make use of a consensual rather than coercive

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[26] Miceli and Sirmans, for example, preface their modeling of the judicial partition choice with the assumption that voluntary partition is unavailable due to high transaction costs. Miceli and Sirmans, 29 J Legal Stud at 788 (cited in note 16).

[27] See Bebchuk, 100 Mich L Rev at 633–34 (cited in note 6) (making an analogous point about the choice between liability rules and property rules).

[28] See Abraham Bell, *Private Takings*, 76 U Chi L Rev 517, 565–66 (2009) (discussing overly fractionated shares in land as a situation potentially ripe for the use of a private taking); Miceli and Sirmans, 29 J Legal Stud at 791 n 22 (cited in note 16).

[29] See Bell, 76 U Chi L Rev at 566 (cited in note 28); Miceli and Sirmans, 29 J Legal Stud at 791 & n 23 (cited in note 16). The point is stronger here than in the context of eminent domain. When the government is the taker, it is not entirely clear whether and how monetary payments influence incentives to take. See, for example, Daryl J. Levinson, *Empire-Building Government in Constitutional Law*, 118 Harv L Rev 915, 916, 969 (2005); Yun-chien Chang, *Private Property and Takings Compensation: Theoretical Framework and Empirical Analysis* 14–46, 75–89, 138–39, 158–60 (Edward Elgar 2013). For private parties, the relationship between monetary payoffs and incentives is far more direct and uncontroversial.

transfer process.[30] Thus, we count it as a point in favor of a judicial partition method if it can control pre-partition strategizing and encourage efficient voluntary partitions. Neither an across-the-board rule of partition by sale nor a blanket rule of partition in kind can reliably achieve this result. Either rule may offer some co-tenants an attractive strategic opportunity to pursue the less socially valuable type of partition in a given case.[31]

Suppose there are two types of co-tenants, some with high subjective values (HSV co-tenants) and some whose valuations merely track the fair market value of the property (FMV co-tenants). Many co-ownership situations will involve a mix of these co-tenant types. Consider first a judicial rule of partition by sale. HSV co-tenants will be fearful of the judicial partition process if they lack the financial ability to be the high bidder in a sale. Knowing this, FMV co-tenants may attempt to extract side payments from the HSV co-tenants for *not* seeking judicial partition. These efforts (and the efforts of the HSV co-tenants to resist making such payments) will be socially costly, regardless of the distributive result.

The bargaining situation is not necessarily improved if the HSV co-tenants are able to bid in the partition sale. FMV co-tenants may resist an efficient voluntary agreement to partition the property in kind if they believe they will get a greater surplus from a partition sale. This could occur if the partition sales procedure will induce an HSV co-tenant to bid her true valuation and will require her to disgorge equal shares of that winning bid to her co-tenants.[32] This procedure will effectively transfer some of the HSV co-tenant's subjective surplus in the property to the FMV co-tenants, and it will do so at positive cost. Interestingly, this problem becomes more severe the better the

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[30] A consensual process might have autonomy-based or distributive advantages, in addition to any efficiency advantages it might have in harnessing information. One of us has argued that property rules, which rely on a consensual process, are more efficient than liability rules, which utilize a coercive process, because the former better harness private information. See Yun-chien Chang, *Optional Law in Property: Theoretical Critiques* *28–29 (Nov 2013), online at http://ssrn.com/abstract=2351651 (visited Mar 2, 2014). The extent and indeed existence of this advantage in the co-tenancy context is open to debate and subject to empirical verification.

[31] An extended example that explores these bargaining dynamics is provided in Appendix C. See Chang and Fennell, 81 U Chi L Rev Dialogue at 6–12 (cited in note 2) (Appendix C).

[32] Whether an auction procedure would actually elicit true valuations or require parties to disgorge a share of their subjective value depends on the design details of the auction procedure. See Part II.A.

judicial sales procedure does at eliciting honest revelations; a blunter procedure would reduce the incentive of the FMV co-tenants to strategically seek judicial partition.[33]

An inverse problem exists when bargaining in the shadow of judicial partition in kind. Here, the HSV co-tenants could stand on their rights and threaten to invoke the judicial partition procedure even when partition by sale would be much more efficient, as where economies of scale are great. In such a case, the HSV co-tenants might threaten to seek judicial partition in kind unless they are paid off by the FMV co-tenants. Indeed, some FMV co-tenants might masquerade as HSV co-tenants in an effort to glean more of the surplus that a sale of the property would bring. These efforts would again be socially costly, even if unsuccessful. Moreover, the HSV (or faux HSV) co-tenants could proceed to invoke judicial partition in kind in order to gain ownership of fragments that could enable them to operate as holdouts in any later-attempted reassembly of the land.

If the parties were always certain that the efficient judicial partition choice would be made by a court—whether partition in kind or partition by sale—none of the co-tenants could threaten the other with an inefficient procedure merely to extract surplus.[34] But to make the efficient choice, the court needs to ascertain whether the value derived from economy of scale is larger than the subjective value lost through auctioning properties off. While the extent of economy of scale can be assessed objectively by, say, hedonic regression models,[35] subjective value is notoriously unobservable by third parties, such as courts.[36] Miceli and

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[33] This suggests a possible silver lining to the auction discount, at least if the HSV co-tenants have the ability to participate in the auction. See text accompanying notes 24–25; Chang and Fennell, 80 U Chi L Rev Dialogue at 4–6 (cited in note 2) (Appendix B).

[34] The statement in the text sets aside the role of time delays in independently generating bargaining leverage. See generally Baucells and Lippman, 22 Cardozo L Rev 1191 (cited in note 6).

[35] Hedonic regression models can be used to first estimate the market value of the whole plot and then used to estimate the summation of market value of each postpartition parcel. The difference in the two estimates is the value of scale economy. Hedonic regression models have been used to estimate market value of real properties in, for example, Yun-chien Chang, *An Empirical Study of Court-Adjudicated Takings Compensation in New York City: 1990–2003*, 8 J Empirical Legal Stud 384, 392–401 (2011); Yun-chien Chang, *An Empirical Study of Compensation Paid in Eminent Domain Settlements: New York City, 1990–2002*, 39 J Legal Stud 201, 214–21 (2010).

[36] See Miceli and Sirmans, 29 J Legal Stud at 793 (cited in note 16); Yun-chien Chang, *Economic Value or Fair Market Value: What Form of Takings Compensation Is Efficient?*, 20 S Ct Econ Rev 35, 64 (2012).

Sirmans's analysis suggests a rough proxy: that partition in kind should be preferred when the land parcel is large and the number of co-owners is small.[37] But this proxy is insufficient to ensure efficient results and may not successfully control strategizing.[38]

In fact, courts typically leave open the possibility of either partition procedure. On one view, this lack of clarity may impede the voluntary partition bargaining process. Parties may be too eager to go to court, each believing he or she can convince the court that economies of scale outweigh subjective valuations, or vice versa. On the other hand, the uncertainty of the judicial partition outcome could reduce certain forms of strategizing and improve bargaining.[39] Ideally, a legal rule would accommodate co-tenants' efficiency-enhancing reasons for requesting or resisting a particular partition method (that it will preserve or destroy subjective value, or that it will realize or undermine economies of scale) without encouraging costly efforts to wrest surplus from other co-tenants.

In addition to raising questions about the optimal strength and clarity of the default rules, this analysis raises empirical questions about how likely the judicial partition rule is to influence the success rates of private bargaining.

C. Intermediate Partition Approaches

The existing economic literature on partition has primarily focused on the choice between partition in kind and partition by sale.[40] But courts need not make a binary choice between these partition methods. Indeed, even traditional partition in kind is often accompanied by compensatory payments among the parties, known as owelty.[41] A variety of other intermediate

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[37] See Miceli and Sirmans, 29 J Legal Stud at 793 (cited in note 16) (examining the effect of lot size and number of parties on the efficiency of competing partition methods).

[38] For example, some situations involving diseconomies of scale may also argue for partition by sale. See Chang and Fennell, 81 U Chi L Rev Dialogue at 12–13 (cited in note 2) (Appendix D).

[39] See generally Ian Ayres and Eric Talley, *Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade*, 104 Yale L J 1027 (1995).

[40] See, for example, Bell and Parchomovsky, 90 Cornell L Rev at 600 (cited in note 20).

[41] Owelty may be used where the property is not amenable to division into equally valuable segments, perhaps due to improvements. See, for example, Dukeminier, et al, *Property* at 343–44, 358 (cited in note 4); John G. Casagrande Jr, Note, *Acquiring Property through Forced Partitioning Sales: Abuses and Remedies*, 27 BC L Rev 755, 764 (1986).

approaches exist in practice. For example, the Russian system couples a strong presumption in favor of partition in kind with a put option that lets any co-tenant be bought out upon her demand.[42] Some US jurisdictions offer an allotment system that gives co-owners who desire continued possession the option to buy out the co-owners who have petitioned for a partition sale.[43] A variation enables some co-owners to break off a portion of the property for exclusive possession while the balance is divided or sold.[44] Court-ordered partial partition is also commonly used in some jurisdictions: empirical studies in Taiwan, for example, show that the court orders partial partition about 60 percent of the time.[45]

In this Section, we consider the intermediate solution of partial partition. To motivate the discussion, consider the following example. A decedent leaves Homeacre to his two children, Ann and Burt, and to a longtime family friend, Casper, in equal undivided shares. Homeacre contains two structures: a family home that sits on two-thirds of the lot, and a detached garage apartment that sits on the remaining third, as shown in Figure 1.

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[42] The Civil Code of the Russian Federation provides:

> If the partition of a participatory share in kind is not permitted by a law or is impossible without incommensurate damage to property in common ownership, the partitioning owner shall have the right to payment to him of the value of his participatory share by the other participants of participatory share ownership.

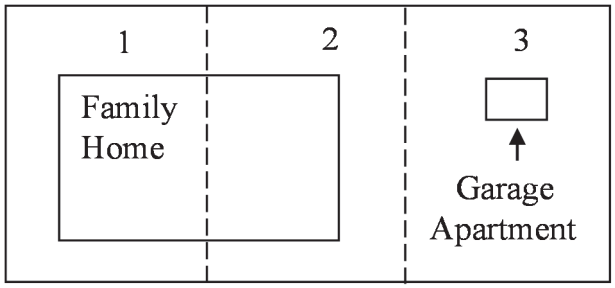
Civil Code of the Rus Federation Art 252(3), as translated in 2 *Russia & the Republics Legal Materials* Part One at 123 (Juris 2013) (William E. Butler, ed and trans).

[43] Zachary D. Kuperman, Note, *Cutting the Baby in Half: An Economic Critique of Indivisible Resource Partition*, 77 Brooklyn L Rev 263, 290–95 (2011) (detailing this approach, which a substantial minority of US jurisdictions have adopted in some form). The Uniform Partition of Heirs Property Act (UPHPA) drafted by the National Conference of Commissioners on Uniform State Laws in 2010 also includes this approach. See National Conference of Commissioners on Uniform State Laws, *Uniform Partition of Heirs Property Act* § 7, online at http://www.uniformlaws.org/shared/docs/partition%20of%20heirs%20property/uphpa_final_10.pdf (visited Mar 2, 2014). See also Kuperman, Note, 77 Brooklyn L Rev at 293 (cited in note 43).

[44] See Casagrande, Note, 27 BC L Rev at 764 (cited in note 41).

[45] See Chang, 4 J Legal Analysis at 535 (cited in note 10). Partition in kind and partition by sale are each ordered about 20 percent of the time. Id. See also *Uniform Partition of Heirs Property Act* § 8, comment 1 (cited in note 43) (observing that "[i]n many [US] states, a court may order a partition in kind of part of the property and a partition by sale of the remainder").

FIGURE 1. HOMEACRE



Ann and Burt grew up in the family home, and Casper, an impecunious musician, has been living rent-free in the garage apartment for the past twenty years. Ann wants to live in the family home, but only if she can have all of Homeacre, including the garage apartment and surrounding yard. Burt, who never liked Homeacre, just wants his share of the money from sale. Casper desperately wants to continue living in the garage, which occupies a central location in a community to which he is deeply attached and has many features that he has tailored to his highly idiosyncratic tastes. The fair market values and the subjective increments[46] that the co-owners attach to the areas in Homeacre identified in Figure 1 are set out in Table 1.

[46] We refer here to the *difference* between the party's reservation price and fair market value. See Thomas W. Merrill and Henry E. Smith, *Property* 249 (Oxford 2010) (identifying a "subjective premium"). The subjective component of an owner's valuation is sometimes called the "consumer surplus." See James E. Krier and Christopher Serkin, *Public Ruses*, 2004 Mich St L Rev 859, 866.

TABLE 1. VALUATIONS OF HOMEACRE'S AREAS

	Fair Market Value	Subjective Increment [Held By]	Total Economic Value
Portion with Home (Areas 1 and 2)	$150K	$0	$150K
Portion with Garage Apartment (Area 3)	$50K	$105K [Casper]	$155K
Whole Parcel (Kept Intact) (Areas 1, 2, and 3)	$250K	$50K [Ann]	$300K

In this case, the total economic value[47] is greater when splitting the property into two pieces ($150K + $155K = $305K) than when keeping it together as a whole ($300K). But it would also be economically destructive to order partition in kind full stop, as this would require physically splitting up the family home, which now occupies two-thirds of the property. We can assume that Ann and Burt, each left with a portion of a house, would eventually coordinate to sell it, but there would be a significant hassle factor. Partition by sale would maximize value if Casper could be the high bidder; he could then keep the garage apartment portion and sell the balance, producing the most valuable use of the land. But Casper is illiquid, and hence not a good candidate to be the high bidder. Alternatively, Ann could be the high bidder at $300K and then sell the two pieces separately, but again, Casper will be unable to bid his valuation of $155K. A sale will at most yield the parties a total value of $300K.

Enter partial partition. The court could let Casper keep his portion of the land, and order partition by sale as to the balance. As Table 2 shows, this solution maximizes the property's total economic value.[48]

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[47] Economic value is the total value an owner attaches to a certain thing. It comprises an objective part (fair market value) and an additional subjective increment. See Chang, *Private Property and Takings Compensation* at 5 (cited in note 29).

[48] It is worth remarking on the ambiguous distributive posture of this result. From the perspective of fair market value, Casper appears to be getting shortchanged. He ends up with property that has a fair market value of $50K, while Ann and Burt get property with a fair market value of $150K, or $75K each. From another perspective, however,

TABLE 2. PAYOFFS FOR ANN, BURT, AND CASPER UNDER DIFFERENT PARTITION APPROACHES

	Ann's payoff	Burt's payoff	Casper's payoff	Total
(1) Full partition in kind	$55 ($75 less $20 in hassle)	$55 ($75 less $20 in hassle)	$155 † (tie)	$265
(2) Partition by sale, and Ann, Burt, and Casper do not participate in the auction	$83.33	$83.33	$83.33	$250
(3) Partition by sale, and Ann is the highest bidder (at her reservation price)	$100 ($300 less $200 to pay off others)	$100 †	$100	$300
(4) Partition by sale, and Ann is the highest bidder (at FMV)	$133.33 ($300 less $166.66) †	$83.33	$83.33	$300
(5) Partial partition: Partition in kind for the garage portion (area 3); partition by sale for the home portion (areas 1 and 2)	$75	$75	$155 † (tie)	$305 †

† marks the best partition approach for a co-tenant and in total.

Note: Gray shading indicates the party retains physical possession of all or part of the property. Values are given in thousands.

Ann and Burt are getting shortchanged. Casper gets something worth $155K to him, while they only get $75K each. He gets more than half of the total economic value generated by the property, whereas if the total of $305K were divided in thirds, they would each get $101.66K. At the same time, Casper's insistence on partition in kind deprives Ann and Burt of the chance to sell the property at a price that would exploit economies of scale; if it were sold at fair market value of $250K, each would receive $83.33K. Ann is also losing the chance to be the high bidder and Burt is losing the chance to share in the surplus that Ann's high bid would generate, if the procedure were one that would elicit Ann's reservation price. These distributive questions will resurface in Part II's discussion insofar as they bear on the earlier decisions or bidding behavior of the parties.

Significantly, a partial-partition alternative will not be pursued if the court follows a rule that seeks to maximize the fair market value of the land; fair market value is higher if the property is kept as a unit. Moreover, if the judicial partition regime requires or allows courts to move directly to partition by sale if full partition in kind is infeasible, then the court would again choose an inefficient outcome, given liquidity constraints. Adding the alternative of partial partition can improve the efficiency of judicial partition outcomes.

As this example shows, partial partition can address liquidity problems that prevent HSV co-tenants like Casper from being the high bidder. Partial partition can also be valuable when multiple co-tenants hold high subjective values in different portions of the property. Rather than requiring them all to bid against each other and then engage in further transactions amongst themselves to get each section of the property back to its highest valuer, a partial-partition procedure can simply allocate the property to those who wish to remain in possession (so long as the areas in which they hold subjective value do not overlap) while cashing out the shares of the other co-tenants.

Carrying out a partial-partition plan requires establishing rules for how payments will be collected from and disbursed to the co-tenants. More fundamentally, it requires some method for determining when partial partition is appropriate. The associated design challenges are explored in the next Part.

II. REFORM AND REVELATION

As our analysis to this point has indicated, a workable set of partition rules must not only account for the core factors of economies of scale and subjective valuations, but must also contend with pre-partition strategic behavior and barriers to bidding such as liquidity shortfalls and coordination problems. In this Part, we examine partial-partition approaches that would make use of information about subjective valuations elicited from the co-tenants. Section A considers the difficulties associated with obtaining truthful information in this context. Section B offers a concrete proposal designed to spur further dialogue.

A. Self-Assessment-Based Partition Rules

As we have seen, the efficient resolution of a partition action may depend on private valuation information that is inaccessible to a court. One possibility is to use the co-tenants' own

self-reported valuations to inform the decision. Self-assessed valuation mechanisms have received primary attention in the eminent domain context,[49] but in some ways the partition context is a more promising setting in which to apply these ideas.[50] The basic idea behind self-assessment is that the owner of a piece of property is in the best position to know its value. The challenge is to devise a mechanism that will induce her to reveal it. Such a mechanism must be capable of checking both overstatements and understatements, and this requires that two consequences tending in opposite directions attach to any statement of value that an owner submits.[51]

There are three types of consequences that might attach to a co-tenant's statement of value. The first is simply whether the co-tenant gets her way with respect to the dissolution of the co-tenancy. If she wishes to stay on the land, does she get her wish? Second, there is the question of what, if anything, she must pay out to the other co-tenants. Third, there is the question of what, if anything, she will receive from the other co-tenants. These last two consequences together determine the positive or negative price associated with the co-tenant getting or not getting her way in the partition proceeding. And these same consequences will influence both valuation statements and the decision to seek or resist judicial partition in the first place.

To return to the private taking analogy, a co-tenant who stays on the land or who is a winning bidder is in the role of a taker who must compensate the others, while a co-tenant who

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[49] See, for example, Abraham Bell and Gideon Parchomovsky, *Taking Compensation Private*, 59 Stan L Rev 871, 890–905 (2007); Yun-chien Chang, *Self-Assessment of Takings Compensation: An Empirical Study*, 28 J L, Econ & Org 265 (2012). See also Saul Levmore, *Self-Assessed Valuation Systems for Tort and Other Law*, 68 Va L Rev 771, 789–90 (1982).

[50] For a recent application of a self-assessment approach to "indivisible" property held in common, see Kuperman, Note, 77 Brooklyn L Rev at 295–300 (cited in note 43). Self-assessment has been used or proposed in a variety of other situations. See, for example, Claudia M. Landeo and Kathryn E. Spier, *Irreconcilable Differences: Judicial Resolution of Business Deadlock*, 81 U Chi L Rev 203 (2014) (dissolution of business entities); Richard A. Epstein, *The Use and Limits of Self-Valuation Systems*, 81 U Chi L Rev 109, 119–21 (2014) (general average contribution); Levmore, 68 Va L Rev 771 (cited in note 49) (several examples, from "claiming" horse races to tort law); Lee Anne Fennell, *Revealing Options*, 118 Harv L Rev 1399, 1444–81 (2005) (land use examples).

[51] See, for example, Chang, 20 S Ct Econ Rev at 67–73 (cited in note 36); Epstein, 81 U Chi L Rev at 109–10 (cited in note 50). For a recent discussion of the challenges involved in designing such a mechanism and the parameters that must be satisfied to induce honest valuations, see Florenz Plassmann and T. Nicolaus Tideman, *Marginal Cost Pricing and Eminent Domain*, 7 Found & Trends Microecon 1, 38–98 (2011).

loses out is in the role of a takee who receives compensation from the others. A party will want to take when she will have to compensate less than what she will gain in kind, while a party will hope to have her property taken if she will be compensated beyond the level of her loss. Likewise, a party will not want to be in the role of a taker if she will have to compensate beyond her gain, and will not want to be a takee if she will receive less compensation than she loses in kind. The valuation statement itself can determine whether one will be a taker or a takee and what price one will receive or pay in that role.

One approach would simply be that if the valuer gets her preferred solution, the court will use her stated subjective value to ensure that all parties receive equal shares from the partition action.[52] Consider again the example of Ann, Burt, and Casper. If the parties submitted the valuations implicit in Table 1 above, this information would reveal to the court that the optimal solution would entail breaking the property into two parts, one of which would go to Casper and the other of which would be sold. The total economic value (counting Casper's subjective premium) of $305K would then be split three ways, $101.66K each. Because the property that Ann and Burt will receive brings each of them only $75K, each would be entitled to receive a payment of $26.66K from Casper. This is no different from the distributive result that would have obtained had there been a partition auction in which Casper was induced to pay his reservation price for the whole property. The only difference is the revelation mechanism.

A concern is that parties like Casper will understate their valuations because the payments they must make are tied to their bids. If they have full information about the valuations of the other parties, they would try to state a value that is epsilon above the next highest bid. Of course, other co-tenants might attempt to push up Casper's valuation statement (since it determines what they will receive from Casper) by threatening to place overstated bids of their own. As Casper attempts to avoid stating his full subjective value and as his co-tenants attempt to force him to do so, understatements and overstatements may place the property in the hands of the wrong party.

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[52] This approach equates to a first-price auction. For a general introduction to and comparison of types of auctions, see Yaad Rotem and Omer Dekel, *The Bankruptcy Auction as a Game—Designing an Optimal Auction in Bankruptcy*, 32 Rev Litig 323, 358–73 (2013).

Yet even if this alternative did a reasonably good job of checking overstatements and understatements, the fact that the amount of one party's subjective valuation determines the payouts to other co-tenants could be problematic from an ex ante perspective. It could lead other co-tenants to strategically seek judicial partition simply to receive transfers of subjective premia from other co-tenants. A procedure that instead ties payouts by a winning co-tenant to another metric, such as the amount that the other co-tenants lose when the court adopts her solution over another, could help to address this issue, although it would do so imperfectly.

For example, a court might require a party like Casper who wins partial partition in kind as a result of his valuation to compensate the other parties for any difference between the value of the shares of the sales proceeds they will realize from the balance of the property, and the shares they would have received had the entire property been sold as a consolidated unit. This, of course, raises the question of what auction or sales mechanism would have been employed to sell the unit as a whole. Depending on the procedure used, the sales price could be anywhere from Ann's full reservation price to something less than fair market value. Regardless of the metric chosen, Casper's payments to the others would not be benchmarked to his own valuation statement, but rather to someone else's valuation of the entire parcel that is elicited through an auction or other revelation procedure.

Will such an approach induce more honest valuations? Casper may be wary of overstating his subjective surplus when it could produce a result—partition in kind plus a duty to compensate—that he likes less than simply getting a share of the proceeds from selling the parcel as a whole. If he is sure he will be better off with partition in kind (after compensating the others), he might well overstate his valuation to be assured of winning partition in kind—and this mechanism would allow him to do so with impunity.[53] But his overstatement would not produce inefficiency relative to partition by sale; by hypothesis, Casper is the

[53] Because there is no penalty tied to the magnitude of his statement once it is over the threshold that wins partition in kind and triggers his compensation obligation, he would not be further constrained from making an overstatement.

highest valuer.[54] While it is always possible for Casper to miscalculate and overbid in error, he is less likely to make this mistake when there are clear reasons to doubt that his preferred solution is the efficient approach—as where there is a large economy of scale associated with keeping the property whole.[55]

Casper also has no obvious incentive to understate his subjective surplus because the amount he has to compensate the others does not depend on how high or low his valuation is, but rather on how high or low the hypothetical sales price would be for the whole property. Of course, the same liquidity problem mentioned above might recur here, causing Casper to simply accept partition by sale rather than submit any valuation statement at all. But this problem is significantly buffered in this context, and presumably easier to solve. Instead of having to go to an auction and bid the full amount of his subjective value (which is far above the property's market value), he need only come up with a fraction of that amount to pay the others.[56]

So far we have been vague about how the payouts from Casper to the other parties would be calculated under this alternative. How we resolve this question will introduce new concerns, including the possibility of strategic bidding by Casper's co-tenants. Suppose Casper's payouts were keyed to Ann's valuation of $300K. If Casper were required to bring everyone to the level they would have occupied had Ann bid this amount and distributed the proceeds equally, then he would have to pay both Ann and Burt $25K each.[57] Because this result compensates Burt beyond the baseline of FMV, it might cause Burt to seek judicial partition and resist a voluntary solution.

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[54] As our regime does not seek to use self-assessed value in the future (such as in levying property taxes), it does not matter that the highest valuer exaggerates his or her true value.

[55] This is because he would run the greatest risk in such situations of getting his way and then having to (over)compensate the others. Depending on how his compensation to the others will be determined, he might also be deterred from overstating his value if he knew another co-tenant, such as Ann in our example, also held significant subjective value in the property, or if he feared strategic bidding by one or more of his co-tenants. See text accompanying notes 57–58.

[56] If Casper cannot access equity in the property immediately, an alternative would be to place a lien on the property. See Ariel Porat, *Private Production of Public Goods: Liability for Unrequested Benefits*, 108 Mich L Rev 189, 212 (2009) (explaining how a lien could address liquidity issues in an expanded restitution context).

[57] Areas 1 and 2 are expected to sell for $150K, which will give Ann and Burt $75K each. An additional $25K would bring each to the $100K level that would result from an even split of Ann's bid of $300K.

Perhaps more worrisome is the fact that it might cause Ann or Burt to strategically overstate their valuations to increase the share they will receive from Casper.[58] They run a risk in increasing their bids if they are uncertain about Casper's true subjective valuation, since they might accidentally outbid him and then have to compensate the others. If Casper fears their overbids will dispossess him of the property, he might overstate his own bid, though again, he does so at the risk of ending up having to compensate for a second bid that is above his own true reservation price. The full dynamic must be left to formal modeling and empirical testing, but the risk exists that the parties' strategic behavior will produce inefficient results.

Another option would merely require the winner to compensate his co-tenants for their share of the whole property's FMV. This approach has the advantage of controlling gaming by the FMV co-tenants who would otherwise try to increase their compensation. The disadvantage is that there would be no check on overstatements by HSV co-tenants like Casper and Ann. They would each put in infinite bids in an effort to outbid the other, knowing that they would only be obligated to compensate the other co-tenants at FMV.

A final set of possibilities would break the link between the amount that Casper must pay and the amount that his co-tenants receive.[59] For example, suppose Casper had to *pay* an

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[58] The procedure described in the text equates to a second-price or "Vickrey" auction. As Professor William Vickrey himself recognized, collusive bids by sellers designed to "jack the price up" can undermine the procedure's truth-revealing properties. William Vickrey, *Counterspeculation, Auctions, and Competitive Sealed Tenders*, 16 J Fin 8, 22 (1961) (noting this problem and suggesting countermeasures). Co-tenants who expect to lose the auction and receive the proceeds of the second bid are effectively in the position of a seller—yet unlike ordinary sellers, they are entitled to bid on the property.

[59] Delinking of this sort has featured in some past auction proposals. See, for example, Clark Wiseman, *Rezoning by Auction—A New Approach to Land Use Decisions*, 35 Utah Sci 86, 87–88 (1974) (describing an auction procedure in which those who win a rezoning must pay their own valuations but those who lose receive only *their* own valuations); T. Nicolaus Tideman and Gordon Tullock, *A New and Superior Process for Making Social Choices*, 84 J Polit Econ 1145, 1148 (1976) (explaining how under a Clarke-Groves voting mechanism "[a]ny money collected from voters . . . must be wasted or given to nonvoters to keep the incentives correct"). The problem remains of what shall be done with the excess money that Casper must pay but that his co-tenants will not receive back. Because the money is collected in a judicial partition procedure, it would be feasible to simply establish a fund related to the administrative costs of adjudicating co-ownership disputes into which excess monies could be deposited. See Wiseman, 35 Utah Sci at 88 (cited in note 59) (suggesting that differences between auction payments in and out, net of administrative costs, "be treated as general tax revenue"); Tideman and Tullock, 84 J Polit Econ at 1154 n 2 (cited in note 59) ("One possibility for avoiding waste

amount that would be sufficient to give his co-tenants their shares of the total economic value of the property ($305K, on the numbers above), but that his co-tenants actually *received* only their share of the property's FMV. This approach would limit overbidding while avoiding gaming by FMV co-tenants (including in the initial decision to seek judicial partition). It would likely produce underbidding (like any other first-price auction), but at least there would not be a concern about FMV co-tenants attempting to force up the bid. The downside of this approach is that other HSV co-tenants like Ann would receive payouts that are significantly less than their subjective valuations. This prospect could open the door to ex ante strategizing or could lead to overbidding behaviors to avoid bearing a loss.

A variation on this theme, which we will use as the basis for our proposal below, would allow co-tenants who elect partial partition in kind to recover their shares of their own synthesized bids, while limiting co-tenants who opted for a partition sale to their share of FMV. Additional design features might be added to control inflated partial-partition bids by FMV co-tenants.[60]

As this brief survey has suggested, it does not seem possible to design a fully incentive-compatible mechanism given the constraints we have specified and the goals we are pursuing. Which of the options canvassed above will perform best is an empirical question and one that could benefit from formal modeling. We will close with a brief summary of how such a procedure might be operationalized under the last alternative discussed above, recognizing that a different set of rules for payments and payouts might ultimately prove superior.

B. A Possible Approach

To fix ideas and to provide a springboard for further empirical and theoretical work, we offer the following three-step proposal for a new judicial partition protocol.[61] It will not produce

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[in a Clarke-Groves voting mechanism] would be for pairs of communities to agree to exchange their collections of these excess revenues."); Abraham Bell and Gideon Parchomovsky, *Governing Communities by Auction*, 81 U Chi L Rev 1, 24–25 (2014) (discussing possible uses of excess funds generated by their auction mechanism, including sharing arrangements among communities).

[60] See text accompanying notes 63–64.

[61] Our proposal most resembles a first-price, sealed-bid auction. See Rotem and Dekel, 32 Rev Litig at 358–73 (cited in note 52). Note, however, that the co-tenant context differs from that of ordinary auctions in one important respect: co-tenants who place bids may wind up as either buyers or sellers (that is, takers or takees), while in ordinary

first-best results, but we think it could represent an improvement over the status quo.

1. Step one: electing a partition method.

A co-owner seeking judicial partition would first be required to state his or her preference for one of two alternatives: full partition of the property by sale, or partial partition in kind. A co-owner who seeks full partition of the property by sale would be requesting the liquidation of the property at FMV. A co-owner who wished to remain on the land could petition for partial partition in kind.[62] To invoke this procedure, a co-owner might have to meet additional criteria, such as demonstrating a connection to the property, satisfying a holding period,[63] or posting a bond that will be forfeited if she wins the right to remain on the property but sells within a particular time frame.[64]

2. Step two: valuation.

The court would ask each party petitioning for partial partition in kind to submit the following: (1) a diagram of the property with any area in which the individual holds subjective value clearly marked, (2) a statement of the total value that the individual places on the marked area, and (3) an independent appraisal of the balance of the property. Following the values given in Table 1 above, Ann would submit a diagram with the entire property marked and a value of $300K indicated. Casper would submit a diagram with the garage apartment area (area 3)

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auctions, bidders occupy only the role of potential buyers (absent collusion with sellers to submit fake bids).

[62] Although partial-partition procedures fit most naturally with multiparty scenarios like the one elaborated in the text, co-tenants in two-party scenarios would also get the same choices: partial partition in kind or full partition by sale. Even when only two parties are involved, one party's share can still be liquidated through sale while the other is awarded in kind. Similarly, one co-tenant could request to retain in-kind possession of an unequal share of the property or even the entire property (as in the case of Ann, above, who had subjective value in the full tract).

[63] For an example of a similar restriction employed in Arkansas, see Kuperman, Note, 77 Brooklyn L Rev at 288 (cited in note 43), citing Ark Code Ann § 18-60-404 (requiring a three-year waiting period before a co-tenant who purchases a minority interest as "a stranger to the title"—defined as not being related to any of the others within four degrees of consanguinity—can petition for partition).

[64] For a similar inalienability approach to preventing false self-assessments in the eminent domain context, see Bell and Parchomovksy, 59 Stan L Rev at 892–95 (cited in note 49).

marked and a value of $155K indicated, and would also submit an appraisal for the balance of the property (areas 1 and 2).

When multiple HSV co-tenants have attachments to nonoverlapping pieces of the property, they may elect to file a combined submission with the court, or they may file separate submissions. Any party filing a separate submission should indicate to the court whether she wishes to have her submission combined with those of the other co-tenants seeking partial partition, where it is possible to do so.[65]

If the submissions reflect conflicting plans for partitioning the property, the court will order an auction at which bids will be automatically placed on behalf of the co-tenants seeking partial partition in kind. Each such bid would be constructed from the reservation price stated for the portion of the property that the co-tenant wishes to retain plus the fair market value of the balance of the property. To return to our earlier example, a bid of $305K would be submitted on behalf of Casper ($155K valuation of area 3, plus $150K FMV of areas 1 and 2), and a bid of $300K would be submitted on behalf of Ann (reflecting her subjective valuation of the whole property).

3. Step three: deciding and settling up.

In our example, Casper would win the bid. He would get to keep area 3, and areas 1 and 2 would be sold for their FMV ($150K). Casper would be required to make a payment into a fund that would be sufficient to give his co-tenants their shares of the full economic value revealed by his bid. Casper would thus have to *pay* $53.33K, the difference between Ann and Burt's collective $203.33K share of $305K and the FMV sales price of $150K for areas 1 and 2.

Ann and Burt do not actually *receive* this full amount, however. Instead, Ann (as a co-tenant who also elected partial partition in kind) would receive enough to make up one-third of her $300K bid (here, $25K)[66] and Burt (who did not elect partial partition in kind) would receive enough to make up his share of the

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[65] Space does not permit tracing all the wrinkles associated with these "bundling" alternatives. The basic intuition is that a group of HSV co-tenants might have a combined valuation that exceeds the FMV of the entire parcel, even though no single HSV co-tenant would have a high enough valuation on her own.

[66] This amount is calculated by subtracting her share from the sale of areas 1 and 2 ($75K) from her share of her own bid ($100K).

$250K in FMV (here, $8.33K).[67] The balance of the funds paid by Casper (that is, the portion that was not disbursed to Ann and Burt; here, $20K)[68] goes into a fund earmarked for co-tenant mediation efforts or for administering the system.[69]

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This three-step approach does not address all difficulties. There is still room for parties to strategize, and concerns with understatements and overstatements will remain. Nonetheless, we think a procedure of this sort may offer a significant improvement over the binary choice between partition in kind and partition by sale. Whether or not our readers agree, we hope our proposal spurs further discussion about the best way to address partition problems. More broadly, we hope that our dissection of the co-tenancy problem offers insights for the use of self-assessment techniques in other contexts.

CONCLUSION

Analysis of co-ownership partition needs to go beyond an ex post comparison of partition in kind and partition by sale. While we agree that scale economies and subjective value are the foremost concerns in determining the most efficient partition approach in a given dispute, this Article contributes to the literature by examining when and how we might employ revelation mechanisms that harness otherwise hard-to-verify subjective values. We show how such approaches might be integrated into

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[67] This amount is calculated by subtracting his share from the sale of areas 1 and 2 ($75K) from his share of the property's FMV ($83.33K).

[68] $20K = $53.33K − $25K − $8.33K. For co-tenants, the $20K that goes to the fund is money left on the table. If they have good information as to how much each other would bid, they may reach an agreement of voluntary partition. Facilitating ex ante bargaining is an advantage of our proposal. Note that because voluntary partition has to be consensual, no co-tenant would agree to a deal that makes him worse off. That is, the $20K would only make all or some of the co-tenants better off in voluntary agreements, as compared to judicial partition. Court costs also represent savings that parties could realize through a voluntary arrangement. See Baucells and Lippman, 22 Cardozo L Rev at 1207–09 (cited in note 6) (modeling the effect of legal costs on bargaining dynamics).

[69] Our analysis here assumes that the property, or relevant pieces of it, will actually sell at FMV. As we point out in Appendix B, the property is likely to be sold below FMV at court auctions. Addressing the risk of below-FMV bids requires additional design features that space does not permit us to fully elaborate here, but the general approach would entail providing opportunities for co-tenants to bid on the relevant portions of the property so that a negotiated sale can be conducted at a later date. The fund could also be used to fill in the gap if the sale price of the sold portion falls below the appraised value.

intermediate partition approaches, such as partial partition, which are prevalent in practice but currently undertheorized. Moreover, our analysis looks not only at the partition event in isolation, but also at the way in which partition rules influence earlier decisions. More empirical and theoretical work on the institution of co-ownership is needed to test the strategies that this Article has discussed or proposed, but we hope to have indicated here some directions such work might take.

Appendices to *Partition and Revelation*

Yun-chien Chang† & Lee Anne Fennell††

APPENDIX A. A COMPARISON OF DEFAULT JUDICIAL PARTITION RULES

In this Appendix we provide a short comparative survey of default judicial partition rules of real estate.[1] The judicial partition regime is constructed of a presumption (or lack thereof) for partition in sale or in kind, a specification of the conditions that will override that presumption, and a variety of other special features.

I. Presumptions and Overrides

An initial question that each jurisdiction's law must address is whether partition in kind or partition by sale will be the preferred approach, and how strong the presumption in favor of that approach will be.

A number of modern jurisdictions take the position that courts should favor partition in kind. This is adopted in Germany,[2] France,[3] Japan,[4] China,[5] and Taiwan.[6] Empirical studies in

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These appendices supplement Yun-chien Chang and Lee Anne Fennell, *Partition and Revelation*, 81 U Chi L Rev 27 (2014), online at https://lawreview.uchicago.edu/page/chang-fennell.

1 Some jurisdictions have addressed partition of chattel property separately. In East Germany, for example, the rule was a mandate of partition by sale for real estate and a preference for partition in kind for movables. See Civil Code of the German Democratic Republic Art 41, as translated in 1–2 *Law and Legislation in the German Democratic Republic* 31 (Lawyers Association 1976).

2 Ger Civil Code § 753, as translated in *Gesetze im Internet* (Juris 2013) (Langenscheidt Translation Service, trans), online at http://www.gesetze-im-internet.de/englisch_bgb/englisch_bgb.html (visited Oct 30, 2013).

3 Fr Civil Code Art 815, 827, as translated in *Legifrance* (France 2006) (Georges Rouhette and Anne Rouhette-Berton, trans), online at http://www.legifrance.gouv.fr/Traductions/en-English/Legifrance-translations (visited Oct 30, 2013).

Taiwan show that the court orders partition in kind only about 20 percent of the time.[7] Most American jurisdictions, as introduced in the main text, have a common law rule that purports to favor partition in kind, but scholars suggest that courts in the United States usually order partition by sale.[8] Thus, partition law in action might deviate significantly from the partition law on the books.

The opposite presumption, that courts should favor partition by sale, has been adopted in Denmark.[9] A third rule that eschews any presumption in favor of either partition approach has been adopted in the Netherlands.[10] There, courts are required to select a partition approach according to public interests and private interests.[11]

A more extreme possibility would disallow or disable courts from pursuing a particular partition approach. We are aware of one jurisdiction, Russia, in which the court has no power to order partition by sale.[12] When partition in kind is "not permitted by a law or is impossible without incommensurate damage to property in common ownership, the partitioning owner shall have

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[4] Civil Code of Japan Art 258, as translated in *Japanese Law Translation* (Ministry of Justice 2013), online at http://www.japaneselawtranslation.go.jp/law/detail/?id=2057&vm=02&re=02&new=1 (visited Feb 2, 2014).

[5] Property Law of the People's Republic of China Art 100, as translated in *Property Law of the People's Republic of China*, online at http://www.china.org.cn/china/LegislationsForm2001-2010/2011-02/11/content_21897791.htm (visited Feb 5, 2014). Value reduction is one justification for using partition by sale. Note that in China, only buildings and other improvements are subject to private co-ownership and hence to partition, as all of the underlying land is owned either by the state or by a collective. See Yun-chien Chang, *Property Law with Chinese Characteristics: An Economic and Comparative Analysis*, 1 Brigham-Kanner Prop Rts Conference J 345, 347 (2012); Property Law of the People's Republic of China Art 47, 58 (cited in note 5); China Const Art 10, online at http://english.gov.cn/2005-08/05/content_20813.htm (visited Feb 10, 2014).

[6] Taiwan Civil Code Art 824, as translated in *Laws & Regulations Database of the Republic of China* (Ministry of Justice 2012), online at http://law.moj.gov.tw/eng/LawClass/LawAll.aspx?PCode=B0000001 (visited Oct 31, 2013).

[7] Yun-chien Chang, *Tenancy in "Anticommons"? A Theoretical and Empirical Analysis of Co-ownership*, 4 J Legal Analysis 515, 535 (2012).

[8] See Yun-chien Chang and Lee Anne Fennell, *Partition and Revelation*, 81 U Chi L Rev 27, 30 n 12 (2014).

[9] See Tanya-Caroline Hitchcock and Malene Stein Poulson, *Dänemark*, in Christian von Bar, ed, 1 *Sachenrecht in Europa: Systematische Einführungen und Gesetzestexte* 7, 62 (Rasch 2000).

[10] Civil Code of the Neth § 3:185, as translated in *The Civil Code of the Netherlands* 475–76 (Wolters Kluwer 2009) (Hans Warendorf, Richard Thomas, and Ian Curry-Sumner, trans).

[11] Civil Code of the Neth § 3:185(1), as translated in *The Civil Code of the Netherlands* at 475–76 (cited in note 10).

[12] See Chang and Fennell, 81 U Chi L Rev at 37 n 42 (2014) (cited in note 8).

the right to payment to him of the value of his participatory share by the other participants of participatory share ownership."[13] The latter procedure effectively extends a put option to the owner who desires partition, forcing a sale of that party's share to the others.

II. Additional Features

The basic choice of approach—partition in kind or partition by sale—is only part of the story. A number of other features determine how partition operates on the ground. First, there can be procedural preconditions to seeking judicial partition (of any sort). Some countries, for example, require that parties attempt voluntary partition before seeking judicial partition. The decision to partition in kind implicates additional choices, sometimes economically significant, about exactly how to physically split the land. When property is not amenable to division into equally valuable segments, perhaps due to improvements, partition in kind may require compensatory transfer payments among the parties, known as owelty.[14]

Partition by sale requires additional choices about the way in which the sale will be structured. A basic distinction can be drawn between negotiated sales procedures and auction procedures, and the two may produce different outcomes and have different efficiency implications. Other details, such as opportunities for inspection and the types of payments that are allowed, can influence who is likely to bid. For example, Professor Phyliss Craig-Taylor argues that a supermajority vote should be required for the court to order partition by sale; she recommends that the court allow for time for winning bidders to pay, so that co-owners would be able to make a bid.[15] Sometimes courts place rather extreme constraints on the sales procedure to constrict participation. In one South African case, *Kruger v Terblanche*,[16] the court ordered a partition by sale but stipulated that only the

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[13] Civil Code of the Rus Federation Art 252(3), as translated in 2 *Russia & the Republics Legal Materials* Part One at 123 (Juris 2013) (William E. Butler, ed and trans).

[14] See John G. Casagrande Jr, Note, *Acquiring Property through Forced Partitioning Sales: Abuses and Remedies*, 27 BC L Rev 755, 764 (1986).

[15] See Phyliss Craig-Taylor, *Through a Colored Looking Glass: A View of Judicial Partition, Family Land Loss, and Rule Setting*, 78 Wash U L Q 737, 780–81 (2000).

[16] 1979 (4) SA 38 (D), as translated in *The South African Law Reports* 1281 (Juta 1979) (J.C. Ferreira, J.H. Kok, and B.G. Morrison, eds).

two brothers who were the co-owners of the farm in question could participate in the bidding.[17]

APPENDIX B. AUCTIONS: THEORY AND EVIDENCE

In this Appendix, we provide an overview of empirical and theoretical work on property auctions to supplement our discussion in the main text.

Professor Christopher Mayer has argued that in English (ascending bid) auctions, "[a]uction prices should be lower than prices for houses sold at negotiated sales, with the possible exception of auctions held in very 'hot' markets."[18] The auction discount results from the fact that auction sales are limited to buyers who are in the market in a given period, while sales taking place in the listing market allow the seller to search for a higher-valuing buyer over multiple periods.[19] Mayer's empirical work finds that auctioned property never sells at a premium.[20] Other scholars who have studied English auction versus negotiated sales in the real estate market, however, disagree with Mayer. Professors Daniel Quan,[21] Kenneth Lusht,[22] and Mark Dotzour

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[17] For a discussion of co-ownership and *Kruger*, see C.G. van der Merwe, *Law of Property*, in C.G. van der Merwe and Jacques E. du Plessis, eds, *Introduction to the Law of South Africa* 201, 221 (Kluwer 2004).

[18] See Christopher J. Mayer, *A Model of Negotiated Sales Applied to Real Estate Auctions*, 38 J Urban Econ 1, 20 (1995). But see Daniel C. Quan, *Real Estate Auctions: A Survey of Theory and Practice*, 9 J Real Est Fin & Econ 23, 38–39 (1994) (criticizing Mayer's approach, because it assumes that "auction sales [do] not influence the equilibrium price of houses sold in the negotiated market").

[19] See Christopher J. Mayer, *Assessing the Performance of Real Estate Auctions*, 26 Real Est Econ 41, 44 (1998). See also Hanoch Dagan and Michael A. Heller, *The Liberal Commons*, 110 Yale L J 549, 607 (2001) (arguing that auctioned properties are sold at below fair market value because there are fewer bidders for auctioned properties than potential buyers for properties on the open market).

[20] Mayer, 26 Real Est Econ at 53–61 (cited in note 19). Professors George Gau and Daniel Quan's hedonic model in their unpublished work also shows that auction prices are significantly lower than negotiated sales. See George W. Gau and Daniel C. Quan, *Market Mechanism Choice and Real Estate Disposition: Negotiated Sale versus Auction* *13 (UCLA Anderson Graduate School of Management Recent Work, June 1992), online at http://escholarship.org/uc/item/77f5k3x9 (visited Oct 31, 2013). Interestingly, this empirical result is contrary to the prediction of Quan's mathematical model. See Quan, 9 J Real Est Fin & Econ at 44 (cited in note 18), for an explanation of the contradictory result.

[21] See Daniel C. Quan, *Market Mechanism Choice and Real Estate Disposition: Search versus Auction*, 30 Real Est Econ 365, 368 (2002) (using 202 auctions and negotiated sales from Austin, Texas, in hedonic regression models and finding that on average, the auction prices for vacant land are approximately 30 percent higher than the negotiated sale prices).

et al,[23] using a similar quantitative strategy (that is different from Mayer's),[24] find that on average auctions sell at a premium. Nevertheless, as Mayer points out, these empirical works may suffer from omitted variable bias, because sellers' decisions to put their properties on the list market or the auction market is probably endogenous.[25]

English auctions are not the only type of auction that sells real estate at a discount. In Taiwan,[26] where courts sell off properties through first-price, sealed-bid auctions, auctioned properties, as compared to comparable properties sold in the search market, are empirically found to be sold at an average discount of about 17 percent.[27] Generally very few bidders participate in any given court auction.[28] Courts in Taiwan provide little information on the auctioned properties and are not always committed to handing over unpossessed properties to the winning bidders.[29] Because only distressed properties (such as real estate under foreclosure) are auctioned by courts in Taiwan, the auction discount may reflect the uncertainty of property conditions, rather than indicating the different effects on prices of sale mechanisms. Nonetheless, the fact remains that partition by sale does not always liquidate properties at or above fair market value.

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[22] See Kenneth M. Lusht, *A Comparison of Prices Brought by English Auctions and Private Negotiations*, 24 Real Est Econ 517, 528 (1996) (finding that English auctions of nondistressed properties yield an average premium of 8 percent in Australia).

[23] See Mark G. Dotzour, Everard Moorhead, and Daniel T. Winkler, *The Impact of Auctions on Residential Sales Prices in New Zealand*, 16 J Real Est Rsrch 57, 67 (1998) (finding that auctions of nondistressed properties in Christchurch, New Zealand, produce either no premium or a positive premium).

[24] These studies all use an auction dummy variable to identify whether auctioned properties on average sell at a premium as compared to properties sold in the listing market. By contrast, Mayer uses weighted repeat-sale regression models. His use of repeated sales that have been sold in both auctions and search markets controls for the omitted variable bias. See Mayer, 26 Real Est Econ at 46–49 (cited in note 19).

[25] See Mayer, 26 Real Est Econ at 45–46 (cited in note 19); Quan, 9 J Real Est Fin & Econ at 43–44 (cited in note 18) (recognizing this point).

[26] For a brief overview of how the auction market in Taiwan works, see Vickey, Chiu-Chin Lin and Chiung-Ying Huang, *A Comparison between the Semi-parametric and Parametric CAMA Modeling of Court Auction Residential Housing Market in the Taipei Metropolitan Area*, 16 J Housing Stud 85, 87 (2007).

[27] See Chin-Oh Chang, Chien-An Wang, and Yi-Ju Chen, *The Puzzle of the Discount Price for the Foreclosed House: Does the Factor of Competition Explain More Discounts?*, 28 Chiao Da Mgmt Rev 1, 27 (Vol 2, 2008), online at http://www.airitilibrary.com/Publication/alDetailedMesh?docid=10287310-200812-28-2-1-39-a (visited Feb 17, 2014).

[28] See id at 14 (finding that in 2001–2002, in 46.6 percent of the court auctions in Taiwan, there was only one bidder).

[29] See id at 5.

APPENDIX C. BARGAINING IN THE SHADOW OF JUDICIAL PARTITION

In this Appendix, we supplement the main text's analysis of the impact of judicial partition rules on pre-partition bargaining dynamics by working through an extended example.

I. Bargaining with No Economy of Scale

We start with the simplest scenario, in which there is no economy of scale; that is, the sale price through partition by sale is the aggregation of the market values of the post-physical-division plots held by the former co-tenants. The analytical framework laid out in the text suggests that without an assembly premium, partition in kind is more efficient. Nonetheless, because subjective increments among co-tenants vary, it is not always in all co-owners' interest to support the plan of physical division. Since unanimity is the universal rule for voluntary partition, it leaves room for strategic bargaining.

Consider the following example: Dan, Eileen, and Frank co-own Blackacre in equal shares. The co-owners have agreed that each co-tenant will manage a one-third section of the plot,[30] each of which has a fair market value (FMV) of w. Dan and Eileen attach an additional subjective increment to the part they have managed for some time, while Frank does not. Assume that s and $2s$ are the added subjective increments for Dan and Eileen, respectively. The total economic value or reservation prices of Dan, Eileen, and Frank on their separately managed parts are $w + s$, $w + 2s$, and w, respectively. If the total market value of Blackacre, sold intact, is $w + w + w = 3w$, physical division does not decrease economy of scale. Following Professors Thomas Miceli and C.F. Sirmans, partition in kind (following the existing management plan) should be adopted because it preserves subjective value and produces total economic value of $w + (w + s) + (w + 2s) = 3w + 3s$, which is higher than $3w$ (the likely value of the property to a third party) or $3w + 2s$ (the

[30] For discussion of this type of covenant, see Yun-chien Chang and Henry E. Smith, *An Economic Analysis of Civil versus Common Law Property*, 88 Notre Dame L Rev 1, 45–46 (2012); Thomas W. Mitchell, Stephen Malpezzi, and Richard K. Green, *Forced Sale Risk: Class, Race, and the "Double Discount"*, 37 Fla St U L Rev 589, 616 (2010); Dagan and Heller, 110 Yale L J at 619 (cited in note 19).

value of the property in Eileen's hands, assuming she wins the bid).[31]

Next, consider the bargaining situation that the parties will find themselves in before seeking judicial partition. If Blackacre is physically partitioned (according to the co-tenants' predefined territories), they each receive their economic value specified above. Dan and Eileen will prefer this approach. Frank, however, might prefer partition by sale. Dan and Eileen have positive subjective values, and if either or both of them have the financial flexibility and willingness to bid in the court auction, the auction price could be higher than $3w$, the fair market value of Blackacre. Frank would then receive a share of the subjective increment that one or both of them have in the property.

Table C1 shows the parties' payouts for different sorts of partition procedures. In each case, the parties lose their fractional undivided claims on the property and get, in exchange, either land (designated by the shaded cells) or money.

[31] See Thomas J. Miceli and C.F. Sirmans, *Partition of Real Estate; or, Breaking Up Is (Not) Hard to Do*, 29 J Legal Stud 783, 793 (2000). We assume for the moment that Dan and Eileen are unable to combine forces to put in the high bid and that Eileen will not otherwise ultimately transfer the portion Dan values to Dan. That assumption will be relaxed below. See Appendix C.II.

TABLE C1. PAYOFFS UNDER FOUR PARTITION PLANS

	Dan's payoff	Eileen's payoff	Frank's payoff	Total
(1) Partition in kind	$w + s$† (tie)	$w + 2s$†	w	$3w + 3s$† (tie)
(2) Partition by sale, and no co-owner participates in the auction	$\leqq w$	$\leqq w$	$\leqq w$	$\leqq 3w$
(3) Partition by sale, and Eileen is the highest bidder (at her reservation price)	$w + {}^{2}/_{3}s$	$w + {}^{2}/_{3}s$	$w + {}^{2}/_{3}s$	$3w + 2s$
(4) Partition by sale, and Eileen and Dan coordinate to bid at their combined reservation price	$w + s$† (tie)	$w + s$	$w + s$†	$3w + 3s$† (tie)

† marks the best partition approach for each co-tenant and in total.
Note: The shaded cells are outcomes in which the party holds onto all or part of the land.

The parties' negotiations take place in the shadow of these payouts. Because Frank stands to gain from a sale in which Dan, Eileen, or both bid their reservation prices, Frank might use the threat of a partition action to extract concessions from Dan and Eileen. To induce Frank to agree to in-kind partition, Dan and Eileen might offer Frank side payments—perhaps each chips in ${}^{1}/_{3}s$. The bargaining may fail, however. First, if Dan and Eileen are confident that they can persuade a court to order partition in kind, they give up nothing (other than litigation expenses) and still get their preferred partition method. Second, the subjective values of Dan and Eileen are not verifiable by Frank. This

may hinder a deal if Frank thinks Dan and Eileen will understate their subjective values and lowball their offers.

It is also worth emphasizing that, in this example, there may be no surplus to be gained from completing the partition. By hypothesis, there are no economies of scale, and the parties already have in place an agreement that lets them manage separate areas separately. Although economic analysis has generally assumed that partition is the efficient result when a co-tenant seeks it (and has sought to determine only how to achieve it at lowest cost), the threat of a partition action might be wielded within an otherwise functional co-tenancy simply to extract surplus from other parties. Such a threat becomes more potent the more likely the court is to order partition by sale under a mechanism that does a good job of inducing co-tenants with high subjective values to reveal—and disgorge a share of—their reservation prices. A blunter auction procedure (or a judicial preference for partition in kind) would remove Frank's source of gain from partition, and with it, his ability to threaten Dan and Eileen.

II. Adding Economy of Scale

How does the scenario above change if there is economy of scale in maintaining Blackacre intact? This requires us to examine the relationship between subjective value and market value. Recall that the s term above represented a subjective increment, a premium over and above the market value of the property. This was straightforward in a static analysis in which market value did not change, but we must now contend with situations in which the market value changes depending on the property's configuration.

Consider first a scenario like the one given above, in which Dan, Eileen, and Frank are each currently managing separate areas of Blackacre. Suppose Dan and Eileen are running small family farms for their households on their respective areas, and Frank is renting out "his" portion as a sheep grazing area. The entire Blackacre property could be converted to a commercial farming operation that would increase the market value of the whole parcel by $2w$, to a total of $5w$. In the example above, Dan had a subjective increment of s, and Eileen had a subjective increment of $2s$. This increment attaches to their current use of the property in family farming, which does not exploit the economies of scale associated with using the parcel as a whole.

What happens now if Frank pushes for partition by sale? The market price for the parcel as a whole is now $5w$. But Dan can be expected only to bid up to $3w + s$, as before, and Eileen likewise can only be expected to bid up to $3w + 2s$. This is because if Eileen, for example, wins the bid, she will only be able to sell the balance of the land (the portions she has not been managing) for $2w$, having destroyed economies of scale by retaining the originally managed portion. If Dan and Eileen can work together to bid, they would bid a maximum of $3w + 3s$; Dan would retain his area and enjoy $w + s$, Eileen would retain her area and get $w + 2s$, and the balance would be sold at fair market value, w. Whether Dan, Eileen, or Dan and Eileen together will be the high bidder in a partition sale depends, then, on how s compares with w, as well as on the liquidity and auction design factors mentioned in Appendices A and B, above.

Regardless of who is the high bidder, partition by sale will likely bring Frank something more valuable than his current parcel, which is valued at w.[32] He will get one of the following: $1^2/_3w$ (if the whole parcel is sold at fair market value); $w + {}^2/_3s$ (if Eileen is the high bidder at her reservation price); or $w + s$ (if Dan and Eileen together have the high bid at their joint reservation price). Here the partition sale could serve the valuable function of testing whether $3w + 3s$ (the highest use of the land in pieces) is greater than $5w$ (the highest use of the land as a consolidated unit). But it will only do so if Dan and Eileen are able to bid.

If Frank knows that $3w + 3s$ is greater than $5w$, but also knows that Dan and Eileen lack the liquidity to put in the $3w + 3s$ bid, he could try to demand side payments in order to go along with a voluntary partition in kind. Alternatively, if Frank knows that Dan and Eileen could be forced (perhaps by his own competing bid) to bid their full joint reservation price, he could attempt to extract much of this value through side payments instead. Frank will be more successful in his demands the greater is the perceived risk that a judicial partition would be by sale rather than in kind, and the greater is the chance that Dan and Eileen will either be unable to bid, or forced to bid their full value.

What if, instead, $5w$ exceeds $3w + 3s$? Where economies of scale are large relative to subjective premia, the latter can

[32] It is possible Frank would not get a larger share if the auction procedure leads to a sale at a deep discount below FMV. But in such a case, Frank himself could be the high bidder and resell in a negotiated sale setting where he would be likely to obtain FMV.

become irrelevant. In other words, the fact that a partition procedure neglects the subjective valuations of the co-owners may have no impact on the final allocation of land. Suppose, for example, that w is \$100K and s is \$50K. $3w + 3s$ is \$450K, which is less than $5w$ (\$500K). Whether the co-owners' subjective valuations are ignored altogether or fully known and accounted for, the result would remain unchanged; the assembly premium associated with keeping the property intact is so great as to overwhelm the subjective increments associated with keeping it in pieces.

In the scenarios above, the ability for Dan and Eileen to enjoy subjective increments depended on them retaining separate control of subsets of the land; their subjective valuations did not attach to the consolidated configuration that maximized market value. But we could also imagine instances in which a co-owner's subjective valuation *would* attach to the entire consolidated unit, as where one tenant has been in sole possession and has become attached to the entire tract. Similarly, things that make a parcel generally more valuable to the market (such as nearby urban development) could either increase or decrease the subjective enjoyment that one or more co-owners get from the property.[33] Thus, large changes in market value, whether associated with scale economies or not, can render moot uncorrelated subjective values held by the co-owners.

This analysis aligns with that of Miceli and Sirmans if the question is limited to whether judicial partition in kind or by sale is more efficient ex post.[34] But the distributive impacts of the two alternatives may lead to different ex ante bargaining dynamics among the co-tenants. In the numeric example above, Eileen would receive a value of \$200K (that is, $w + 2s$) under partition in kind, whereas she would receive one-third of \$500K under partition by sale, or \$166.66K. She is therefore made worse off by the shift from partition in kind to partition by sale, despite the allocative efficiency of selling the property as a unit. If partition in kind is the rule, Dan or Frank might be able to make a side payment to Eileen sufficient to convince her to

[33] It is therefore useful to think of the subjective increment as being reverse engineered for any given co-owner; it can be obtained by subtracting the market value from the co-owner's total reservation price (economic value) for the property. Thus the s term is not fixed for a given co-owner, but can only be determined once we know how her reservation price compares to the (current) market value.

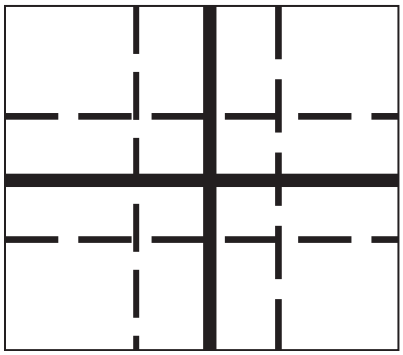
[34] See text accompanying note 31.

support a voluntary sale instead. If partition by sale is the rule, Eileen might attempt to pay Dan and Frank not to petition for the sale, but she would fail (she could not pay them enough to stop the sale).

APPENDIX D. DISECONOMIES OF SCALE

This Appendix explores the possibility that diseconomies of scale, as well as the economies of scale discussed in the main text, can weigh in favor of partition by sale on efficiency grounds. Consider a large tract of land, represented by the large square in Figure D1, that will serve its highest and best use if it is divided up into nine small tracts containing single-family, owner-occupied dwellings.[35] Suppose there are four co-tenants. The small number of co-tenants and the large size of the tract relative to the highest and best use of the land might seem to argue for partition in kind,[36] but dividing the tract among the co-tenants could easily impede getting the land into its most useful configuration.

FIGURE D1. PARTITION IN KIND WITH DISECONOMIES OF SCALE



As Figure D1 demonstrates, producing four of these nine lots would require the cooperation of two former co-owners, and

[35] Agency problems with the rental form might explain the preference for dividing the tract into separately owned parcels. See Edward L. Glaeser, *Rethinking the Federal Bias toward Homeownership*, 13 Cityscape: J Pol Dev & Rsrch 5, 6 (Number 2 2011) ("In general, ownership should be lodged with the agent who is in the best position to make investments and, in the case of a single-family detached house, that agent is the resident.").

[36] See Miceli and Sirmans, 29 J Legal Stud at 792–93 (cited in note 31) (explaining that scale effects that would argue for a forced sale over partition in kind are less likely to be present where the number of co-tenants is few and the parcel is large).

producing one of them would require the cooperation of all four. Partition by sale thus may provide the smoothest path to optimal scale, even where *diseconomies* of scale are involved.[37]

[37] One might instead characterize the situation in Figure D1 as a special case of positive economies of scale, if the land use in question is defined as follows: serving as a canvas for the optimal subdivision of land where returns to scale are not constant. A larger tract offers more alternatives for efficient subdivision than does a group of smaller tracts. Regardless, the situation is one that would not get picked out as a candidate for partition by sale by the Miceli and Sirmans approach. See Miceli and Sirmans, 29 J Legal Stud at 793 (cited in note 36). Their analysis does, however, recognize a conceptually related case of scale effects. See id at 789 n 17 (describing a situation in which the full parcel is no more valuable than the sum of the pieces held by the *n* individual co-tenants, but the land might be more profitably divided into fewer than *n* pieces).

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