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Of Property and Information

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ESSAY

OF PROPERTY AND INFORMATION

Abraham Bell and Gideon Parchomovsky***

The property–information interface is perhaps the most crucial and undertheorized dimension of property law. Information about property can make or break property rights. Information about assets and property rights can dramatically enhance the value of ownership. Conversely, a dearth of information can significantly reduce the benefits associated with ownership. It is surprising, therefore, that contemporary property theorists do not engage in sustained analysis of the property–information interface and, in particular, of registries—the repositories of information about property.

Once, things were different. In the past, discussions of registries used to be a core topic in property classes and a focal point for property scholarship. In recent decades, registries have lost their luster for scholars, and their discussion has been relegated to the innermost pages of property textbooks. The reason for this is that registries are widely considered the domain of legal practitioners, not of theorists.

This Essay argues that nothing could be further from the truth. Registries and the information they contain are, in fact, the formative forces that shape the world of property and no theoretical account of the institution of property can be complete without them. In this Essay, we offer the first in-depth legal-theoretical analysis of the intricate relation-

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ship among title information, rights, and assets in the domain of property, as mediated by registries.

Our analysis gives rise to several new insights. First, we highlight the triple role that registries perform for property owners. They simultaneously perform a facilitative role by streamlining transactions between willing sellers and buyers, an obstructive role by hindering non-consensual encroachments and takings of assets, and an enabling role by allowing owners to locate and use their own lost assets. Second, going against the accepted lore, we posit that perfect registries, even if they were possible, are socially undesirable on account of what we call “the information–asset paradox.” Perfect information about assets and legal rights may result in the destruction, dismembering, and mutilation of the asset by nonconsensual takers in an attempt to make the asset unrecognizable, as exemplified by millions of stolen cars and jewelry, or, conversely, in attempts of “identity theft” that confer thieves with the benefit of the registered rights. Third, we argue that the registries are socially desirable when it is impossible or difficult to alter the defining characteristic of the underlying asset. This insight explains why there are registries for nontransformable assets, such as land and unique artworks, but not for transformable assets that include mass production goods and many natural resources. Finally, we address the question of which rights should be covered by registries and how much legal deference should be given to them.

The framework we provide is significant not only for theoretical reasons but also for practical ones. For example, it can inform policymakers in deciding whether to establish new registries for smartphones and personal computers in order to combat theft of such devices. Similarly, our analysis sounds a cautionary note about the ability of registries of copyrighted works to curb unlawful appropriation and distribution. Per our analysis, such assets are infinitely malleable and, worse yet, information concerning ownership in such works can be easily effaced or altered in the digital age. We also discuss how considerations of costs and privacy affect the comprehensiveness and integrity of registries. At the end of the day, our analysis exposes the promise and the limitations of registries, as well as the ways in which they can be improved by the state.

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INTRODUCTION

Very few concepts affect our property system as profoundly as information about property rights.¹ In this Essay, we argue that extant theorizing on the property–information interface, while illuminating and important, misses essential aspects of the intricate and dynamic relationship between property and information. The Essay seeks to address this omission and offer a deeper understanding of how information shapes rights and assets in the property domain.

To date, legal scholarship on the property–information interface has primarily focused on three questions. First, most theorists who have investigated the interface between information and property rights have focused their attention on property rights in information itself. This is best evidenced by the vast and ever-growing literature on intellectual property (IP) law.² Secondarily, in the context of standard property law,

1. See, e.g., Clarisa Long, *Information Costs in Patent and Copyright*, 90 *Va. L. Rev.* 465, 468 (2004) [hereinafter Long, *Information Costs*] (emphasizing significance of making observers aware of property rights held by others so they may effectively comply with responsibilities saddled on them by creation of right in question); Meredith M. Render, *Complexity in Property*, 81 *Tenn. L. Rev.* 79, 96–118 (2013) (providing comprehensive overview of information-costs thesis propounded by Thomas Merrill and Henry Smith and important critiques offered in counter).

2. See, e.g., David S. Abrams & R. Polk Wagner, *Poisoning the Next Apple? The America Invents Act and Individual Inventors*, 65 *Stan. L. Rev.* 517 (2013) (leveraging empirical model to predict impact of America Invents Act on proportion of patents secured by individual investors); Shyamkrishna Balganesh, *Copyright Infringement Markets*, 113 *Colum. L. Rev.* 2277 (2013) (advocating independent market for copyright claims and outlining potential benefits of permitting third-party involvement in copyright infringement claims); Tun-Jen Chiang & Lawrence B. Solum, *The Interpretation–Construction Distinction in Patent Law*, 123 *Yale L.J.* 530 (2013) (distinguishing between sources of uncertainty in patent claim construction); Amy Kapczynski & Talha Syed, *The Continuum*

scholars—most notably Thomas Merrill and Henry Smith,³ as well as Clarisa Long⁴—have examined how the internal design of property doctrines and principles convey information to the public at large. Finally, and relatedly, some scholars have concentrated on the way various doctrines, such as those related to adverse possession, encourage or demand that claimants reveal information.⁵

None of these bodies of literature address the special role of information about title in property. In this Essay, we analyze the value of

of Excludability and the Limits of Patents, 122 *Yale L.J.* 1900 (2013) (positing excludability in patent rights is asymmetrical for different kinds of information and suggesting alternative approaches to property protection are necessary); Jonathan Masur, Patent Inflation, 121 *Yale L.J.* 470 (2011) (arguing institutional relationship between Patent Trademark Office and Federal Circuit leads to inflationary pressure on patents); Dotan Oliar, The Copyright–Innovation Tradeoff: Property Rules, Liability Rules, and Intentional Infliction of Harm, 64 *Stan. L. Rev.* 951 (2012) (investigating potential for property rules and liability rules to minimize interference between copyright owners and maximize innovators’ incentive to invest); Gideon Parchomovsky & Alex Stein, Intellectual Property Defenses, 113 *Colum. L. Rev.* 1483 (2013) (suggesting ways to expand binding precedential value of individual patent claims and prevent superfluous litigation from imposing societal costs); Jeremy N. Sheff, Marks, Morals, and Markets, 65 *Stan. L. Rev.* 761 (2013) (suggesting new theoretical framework for evaluating trademark system centered on moral obligations between consumers and producers); Christopher S. Yoo, Beyond Coase: Emerging Technologies and Property Theory, 160 *U. Pa. L. Rev.* 2189 (2012) (examining interdependencies characterizing new technologies and resulting implications for choice of property form); Xiyin Tang, Note, The Artist as Brand: Toward a Trademark Conception of Moral Rights, 122 *Yale L.J.* 218 (2012) (arguing artists’ “moral rights” benefit public by lowering search costs and increasing efficiency in art markets).

3. See Thomas W. Merrill & Henry E. Smith, Optimal Standardization in the Law of Property: The Numerus Clausus Principle, 110 *Yale L.J.* 1, 40–42 (2000) [hereinafter Merrill & Smith, Optimal Standardization] (identifying minimization of information costs as key rationale guiding numerus clausus principle, and advocating resort to legislature, rather than judiciary, as appropriate institutional forum for modifying closed list of recognized property interests); Thomas W. Merrill & Henry E. Smith, The Property/Contract Interface, 101 *Colum. L. Rev.* 773, 795–96, 801–02 (2001) (arguing in rem character of property rights renders rules governing them more rigid due to need to furnish information to wider pool of individuals); Henry E. Smith, Property and Property Rules, 79 *N.Y.U. L. Rev.* 1719, 1753–54 (2004) [hereinafter Smith, Property Rules] (suggesting property rules enjoy advantage over liability rules insofar as they allow decentralization of decisionmaking and concomitant reduction of information costs).

4. Long, Information Costs, *supra* note 1, at 480–82 (observing in intellectual property context that “[l]egal rules must balance the goal of reduction of information costs with other social values” and that best rules “will not always be the ones that make transmission of information about the good easy”); Clarisa Long, Patent Signals, 69 *U. Chi. L. Rev.* 625, 667–71 (2002) (presenting model of patents as signaling mechanism used for conveying information).

5. William C. Marra, Adverse Possession, Takings, and the State, 89 *U. Det. Mercy L. Rev.* 1, 14–15 (2011) (arguing deterrence of rent-seeking, by compelling record owner to come forward, disclose information, and stake her claim within statute of limitations, is one of the more powerful justifications for adverse possession); Thomas J. Miceli & C.F. Sirmans, An Economic Theory of Adverse Possession, 15 *Int’l Rev. L. & Econ.* 161, 164 (1995) (describing how time-limited property rules create incentives to uncover and share information *ex ante*).

this information and the means of efficiently producing and disseminating it. Our analysis is based on the simple idea that the value of title to property rights vitally depends on the degree to which it is known by people in the world, including the property owner.

Knowledge about title to property rights is crucial to enjoying their value. If one “owned” an asset, but nobody knew about the ownership, its value would be deeply compromised. Buyers would not readily appear, as they would not have any information to confirm the title of the seller. Third parties might use the asset and even destroy it, believing in good faith that it belonged to no one. Owners would sharply constrain uses of their asset in order to avoid actions that might be interpreted as compromising their title, and they would expend greater resources on protecting their ownership. An owner without knowledge of title would fail to exploit the value of the asset. In short, the value of property rights is directly affected by the quality of information about title to those rights.

The world of property provides many examples of the value of information about property title. Consider, for instance, the sad case of insurance monies and bank assets belonging to victims of the Holocaust. While the Nazis looted much of the property of their victims, many assets, such as bank accounts in Switzerland, remained out of Nazi Germany’s reach. By murdering the owners of the accounts together with most of their families, the Nazis left the assets—worth hundreds of billions of dollars—in the hands of Swiss banks, while the true owners of the assets (the heirs of those murdered by the Nazis) had no knowledge of their property rights. Knowledge of title to the assets in this case was worth hundreds of billions of dollars.⁶ A more prosaic set of examples can be found in the television program “Heir Hunters,” broadcast by the British network BBC, focusing on probate detectives and their attempts to locate owners who are unaware that they have inherited assets and money.⁷

Just as the lack of good title information about property can hinder owners’ use and enjoyment, the opposite is also true: Full information about ownership in assets can help increase value for owners by discouraging nonconsensual takings of the assets. Indeed, this is the reason for the rise of registries for rights in movable goods, such as cars and

6. Legal resolution of the claims ultimately involved a number of legal and political questions beyond the mere question of knowledge of title. For a review of the litigation and its settlement, see *In re Holocaust Victim Assets Litig.*, 105 F. Supp. 2d 139, 141–43 (E.D.N.Y. 2000); *Holocaust Victim Assets Litigation (Swiss Banks)*, <http://www.swissbankclaims.com/Overview.aspx> [<http://perma.cc/Y8XG-YR6Q>] (last updated Sept. 22, 2015).

7. See *Heir Hunters*, BBC, <http://www.bbc.co.uk/programmes/b007nms5> [<http://perma.cc/MD82-CUTK>] (last visited Sept. 18, 2015) (advertising “[s]eries following the work of heir hunters, probate detectives looking for distant relatives of people who have died without making a will”). Many other examples can be found in the world of intellectual property and, in particular, what are known as “orphan copyrights.” See *infra* note 99 and accompanying text (examining prevalence of “orphaned” copyright works).

boats. To give a recent example, many universities have established title registries in bicycles to battle the epidemic of bicycle theft on campuses.⁸ This policy is predicated on the belief that information about assets creates as important a deterrent against theft as locks, chains, and security cameras.

This Essay constitutes the first attempt to illuminate the symbiotic relationships between information and property. It seeks to make three contributions to our understanding of how information and property interact, each of which targets a separate dimension of the interplay between the two. First, we analyze the “obstructive” and “enabling” functions of information about title to property. Extant theorizing has focused primarily on what we call the “facilitating function” of information about property. The facilitating function refers to the role of information in streamlining consensual transactions between rights holders and legitimate purchasers by lowering transaction costs. Following observations first made by Steven Shavell,⁹ we demonstrate that information about property rights performs several key functions (and not one as was previously emphasized) in our property system: a facilitating function, an obstructive function, and an enabling function. The obstructive function refers to the ability of information to block, or at least hinder, nonconsensual appropriations of property by illicit parties, such as thieves and defrauders. The enabling function, by contrast, refers to the way title information in the hands of the owners is necessary for them to enjoy the benefits of property ownership. Interestingly, we show that the three functions can be contradictory or complementary, depending on the informational environment.

Second and equally importantly, we unveil the potential tension between title information and the safety of an asset, which we dub “the information–asset paradox.” At first blush, it seems clear that society would be best off with an informational regime that offers perfect information about title to property rights in assets. Upon closer examination it becomes clear that is not the case. As we show, in a world with perfect information about rights to assets, nonconsensual takers would resort to altering physically or even destroying others’ assets. Such activities may include disassembling automobiles, machinery, and electronic goods, and transforming jewelry into scrap metals.¹⁰ Alternatively, where property information is collected in a particular location as part of a centralized registry, but the information is vulnerable, nonconsensual takers may attempt to take control of the information and thereby make it easier for the property to fall into unsavory hands. The crime of “identity theft” is based on just such a practice. By appropriating the owner’s

8. See *infra* section I.C (examining effectiveness of bicycle registries in combating theft).

9. Steven Shavell, *Foundations of Economic Analysis of Law* 46–52 (2004).

10. See *infra* section II.A (surveying strategies of nonconsensual takers).

“identity,” the thief is able to take possession of all the assets registered in the owner’s name.¹¹

All such activities are value reducing not only for the owner but also for society as a whole. Counterintuitively, society is often better off when the encroacher misappropriates the owner’s asset instead of destroying it. Perfect information about assets will, therefore, not always be in society’s best interest.

Third, we highlight the dynamic nature of property and information about property. Assets, property rights, and title information can be changed, and there are three different categories of actors who can bring about these changes. Property owners (and their potential consensual transferees), nonconsensual takers, and the government all constantly struggle over the information–asset interplay. Each group’s actions can dramatically affect the informational environment that surrounds property rights. Adopting a dynamic perspective, we identify the previously hidden strategies that animate actions in the world of property in response to the informational background. Specifically, we show that when information about ownership may be easily manipulated, registries produce little value for owners. This can best be seen in the copyright realm. In the digital world, information about rights may be easily effaced, altered, and manipulated. As a result, copyright owners face a near impossible task controlling their intellectual assets online.¹²

Just as importantly, we show that the incentives of the actors are not uniform; they may change over time. To point to just one outstanding example, consider the incentives of an owner who finds herself in debt and possibly subject to enforcement actions by creditors.¹³ Whereas the owner might earlier have sought good title information in order to protect her ownership interests in assets, the owner might now seek to hide assets from creditors and might therefore seek to obscure or destroy title information. As owners move closer to insolvency, or as they are more likely to lose their assets to creditors, their incentives move closer to those of nonconsensual takers, while creditors’ incentives move closer to those of solvent owners.

An important policy implication of our analysis that departs from prior theorizing is that, despite the high value of registries, for many categories of assets, it does not make sense to establish registries. We demonstrate that the key to the successful operation of registries lies not in the information per se, but rather in the fit between the information

11. See *infra* notes 123–124 and accompanying text (discussing this nonconsensual taker strategy).

12. See *infra* section III.B.1 (considering opportunities for effacement of ownership information in copyright context).

13. See *infra* section II.C (examining debtor incentives to conceal title information from creditors).

and the asset as it exists in the real world.¹⁴ In general, registries are most valuable when there is confidence that the asset as it exists in the real world will continue to match the description in the registry. This is because assets may be physically vulnerable even when ownership information is protected in registries. The easier it is to undermine the fit between asset and information by changing the information or the asset, the less valuable the registry will be. For example, when it is possible to reconfigure the asset without significant loss in value, as in the case with mass-produced jewelry, a title registry will be of only limited value to owners.¹⁵

Additionally, it will rarely be socially desirable to make the information in registries comprehensive. This is because the value of accurate information in facilitating transactions and obstructing involuntary takings must be balanced against the costs of obtaining and maintaining accurate information. The state must also act cautiously before investing registries with the final say in establishing title. Where the information in registries establishes ownership despite any potential flaws in the title, the registries potentially make it easier for involuntary takers to “launder” their takings.

Structurally, the Essay proceeds in three parts. In Part I, we explore extant theorizing of the property-information interface. In Part II, we offer our account of the relationship between property and information by engaging in a dynamic analysis of the two institutions that pays heed to the intricate subtleties generated by the interplay between them. In Part III, we discuss the informational policies lawmakers should adopt in order to improve the workings of our property system. A short conclusion ensues.

I. TRANSACTIONS AND INFORMATION ABOUT PROPERTY

Information about title to property is vital to the functioning of a legal system of property, but, to date, it has drawn distressingly little scholarly attention. This is surprising, in particular, given the well-developed scholarly literature on a closely related question: how the internal design of property doctrines and principles conveys ownership information.

The main contributors to this latter literature are Professors Merrill and Smith. In their joint work, they advance an information-based justification for the closed enumeration rule (*numerus clausus*), which limits the types of property rights (such as fee simple, tenancy in com-

14. See *infra* section III.B (emphasizing registries’ role in optimizing alignment between asset and identifying information).

15. See *infra* section II.A (noting value of registries is reduced when thieves can profitably reconfigure asset).

mon, etc.) to those already established by law.¹⁶ Professors Merrill and Smith explain that since property rights bind third parties, it is desirable to limit the number of recognized rights so that third parties will not have to expend excessive efforts on educating themselves about the content and nature of property rights.¹⁷ Accordingly, Professors Merrill and Smith argue, the task of recognizing new rights is entrusted to the state alone.¹⁸ Elaborating on the same theme, Professor Smith, in a series of individually authored articles, draws on insights from the economics of information to expound the informational effects of such property doctrines as possession in order to explain how their doctrinal designs communicate information to third parties.¹⁹

Our aim is very different. We do not seek to explain how and why the law defines what property rights are. Rather, we ask how and why the state conveys information about title in those rights. The most common means of conveying information about property rights is a property registry, which lists different property rights and their owners. The extant literature on registries has primarily focused on one narrow aspect of the interplay of asset and information: Registries convey information cheaply and thereby lower transaction costs between sellers and buyers of property.²⁰ The information in registries allows consensual buyers to identify the sellers with whom they wish to transact, as well as to ascertain the precise nature and scope of the sellers' rights. At a risk of a mild overgeneralization, it can be said that existing scholarship focuses on the effect of registries on the owner's ability to transfer property. The scholarship highlights what we call the "facilitating function" of registries in easing transfers.

In this Part, we show that registries offer two virtues that have drawn far less attention. First, registrations enable owners to recognize their ability to use assets. This is most obvious in cases like the Nazi-seized

16. Merrill & Smith, Optimal Standardization, *supra* note 3, at 69 ("Permitting free customization of new forms of property would impose significant external costs on third parties . . ."). But see Abraham Bell & Gideon Parchomovsky, Of Property and Federalism, 115 *Yale L.J.* 72, 80 (2005) (advocating "flexible version of the *numerus clausus* principle, [which] allows owners to go beyond the menu of property forms offered in their jurisdiction and to import forms from other states that better fit their needs").

17. See Merrill & Smith, Optimal Standardization, *supra* note 3, at 27–29 (classifying individuals affected by property relations into three categories and arguing third class of "other market participants," i.e. those outside "zone of privity," are ones most affected by failure of information about holding in question).

18. *Id.* at 58–60 (contending courts are inhospitable forum to enlarge closed list of property interests and positing function is best discharged by legislature).

19. Henry E. Smith, Exclusion and Property Rules in the Law of Nuisance, 90 *Va. L. Rev.* 965 (2004); Henry E. Smith, Intellectual Property as Property: Delineating Entitlements in Information, 116 *Yale L.J.* 1742 (2007); Henry E. Smith, The Language of Property: Form, Context, and Audience, 55 *Stan. L. Rev.* 1105 (2003); Smith, Property Rules, *supra* note 3; Henry E. Smith, Property as the Law of Things, 125 *Harv. L. Rev.* 1691 (2012).

20. See *infra* section I.A (surveying existing literature on registries).

assets, where the true owners were unaware of their ownership interests in the assets.²¹ Registries, in such situations, allow owners to discover their legal interest and start using their property. In other words, registrations can also be said to fulfill an “enabling” function.

Second, registrations strengthen owners’ powers of exclusion by playing a critical role in deterring involuntary takings or uses of assets. In our terminology, the registries bear an “obstructive function” alongside their facilitating function. Information about assets thus affects a larger audience than merely consensual buyers and sellers. The information affects *non*consensual takers who seek to deprive property holders of their entitlements by deploying a range of illicit strategies, ranging from forceful takings to fraud. As information about the true state of title of an asset spreads, the ability of nonconsensual takers to seize control of and profitably use the asset shrinks. Nonconsensual takers must curb public uses of the assets where their lack of title might be revealed. Additionally, nonconsensual takers will encounter greater difficulties in transferring possession of the assets.²² Many nonconsensual takers do not intend to use the taken assets themselves; rather, they seek to sell them to third parties and thereby integrate them into the stream of commerce. A thief who operates on a college campus obviously does not need more than one bicycle, laptop, or smartphone for self-use; all the other items are stolen to be sold to third parties. Better information about licit rights obstructs the transfer of property by thieves, deters the thieves’ potential customers, and thereby helps secure value in the property rights for the licit owner.

Information in registries, therefore, plays a role in two distinct kinds of transfers: It facilitates voluntary licit transfers, while simultaneously obstructing involuntary or illicit transfers. Information about property in registries is a valuable safety device that works to the advantage of property owners. It allows them to use their assets more freely and extensively and hence derive more value from them. In this capacity, registries strengthen not just owners’ rights to transfer but also their right to exclude, which is considered by many property scholars to be the key property incident.²³

21. See Morris A. Ratner, *The Settlement of Nazi-Era Litigation Through the Executive and Judicial Branches*, 20 *Berkeley J. Int’l L.* 212, 212–24 (2002) (chronicling travails of litigants and litigation course that led to successful outcome after several years of struggle for recognition of victims’ claims).

22. See Shavell, *supra* note 9, at 47–48 (noting registration systems discourage theft because “value of stolen property to a thief is . . . diminished by the chance that it will be discovered and taken away and that he will be punished”).

23. See Thomas W. Merrill, *Property and the Right to Exclude*, 77 *Neb. L. Rev.* 730, 731 (1998) (“[T]he right to exclude others is a necessary and sufficient condition of identifying the existence of property.”).

In this Part, we explore the function of property registries in facilitating licit transactions and obstructing illicit transactions. We begin by examining previous analyses of property registration.

A. *The Facilitating Function of Property Registration*

For the most part, existing literature on registries of property information may be divided into two major categories: the economic literature and the legal literature. The economic literature focuses on the formalization of property rights. It is characterized by a high level of abstraction, but it is not terribly interested in legal niceties. Consequently, it often disregards legal distinctions that we will show are critical. The legal literature is curiously out of date—a great deal was written about land registration systems in the 1930s, but recent years have seen few contributions.

The main contributors to the economic literature include Hernando de Soto, Dean Lueck, Gary Libecap, and Benito Arruñada.²⁴ They discuss registration primarily in the broader context of “titling,” often conflating the two. Registration and titling, however, are distinct phenomena. Registration means recording property rights in a fashion that disseminates information about them more widely. Titling, by contrast, is concerned with the legal validity of claimed property rights. Titling projects attempt to grant legal title to assets that are already functionally (though perhaps illicitly) “owned” by claimants.²⁵

For example, in his seminal work on informal property rights in Latin America,²⁶ Professor de Soto discusses de facto property rights, such as those that exist in favelas in Brazil and urban areas in Peru, where squatters possess large swaths of land. While the squatters have no legal title to the lands, they operate under a network of informal property rights that bind the dwellers inter se and are not recognized by the state.²⁷ Addressing the welfare loss resulting from the existence of such de facto rights, Professor de Soto points to the importance of formal

24. We discuss Steven Shavell’s important contributions separately in section I.B, *infra*.

25. We wish to make this conceptual distinction for the sake of clarity. However, cf. Anne-Marie Leroy & Jonathan Lindsay, *Agricultural Investment and Land: Some Reflections on Lessons Learned (and Still to Be Learned) from Experiences with Land Titling*, 17 *Uniform L. Rev.* 15, 18–19 (2012) (highlighting different senses in which the term “titling” is commonly used and how variants run entire gamut from creating or conferring new or heightened legal protection to merely acknowledging existence of “well-established” proprietary rights).

26. Hernando de Soto, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* (2000).

27. *Id.* at 88–95 (detailing myriad ways in which extralegal property arrangements mark their presence in developing world).

state recognition of property rights.²⁸ Professor de Soto argues that the absence of state recognition and registration of these property rights greatly diminishes their value (and therefore further impoverishes the squatters).²⁹ For example, Professor de Soto notes that favela dwellers cannot use equity in their de facto realty holdings as security for loans, and therefore cannot use them to support the creation of businesses.³⁰ Because the informal property lacks the panoply of protections that come with state recognition, it cannot be mortgaged, pledged, or levied upon.³¹ Professor de Soto's proposed solution is a massive titling effort that would bring those rights into the formal property system.³² His proposal pays relatively little attention to the legal details of such an effort.

In legal parlance, Professor de Soto's work concentrates on the issue of titling.³³ That is, Professor de Soto is primarily interested in the state assigning legal title. Our Essay, by contrast, focuses not on the question of who should get legal title but how to treat information about the already existing title. The benefits anticipated by Professor de Soto naturally require both titling and registering. Few banks would agree to lend money on the security of a mortgage were the title unregistered, even if the title were legally cognizable. Nonetheless, Professor de Soto's work conflates the questions, treating the process of titling as necessarily entailing recording as well.³⁴

28. *Id.* at 47–62 (identifying six important ways legal recognition of proprietary interests can benefit economy). But see Abraham Bell & Gideon Parchomovsky, *Property Lost in Translation*, 80 *U. Chi. L. Rev.* 515, 570–72 (2013) (citing Professor de Soto's work and cautioning mere recordation of property interests may not necessarily work when localized property norms are at variance with state-imposed regulatory framework).

29. De Soto, *supra* note 26, at 29 (pointing out how many real estate holdings are extralegal from beginning or fall out of law's ambit due to mounting compliance costs, resulting in many potential assets not being identified or realized).

30. *Id.* at 85–86 (declaring this to be state of legal apartheid).

31. *Cf. id.* at 56 (discussing ability of Western formal property systems to protect and track property through public recordkeeping and thereby enable utilization of assets as capital).

32. See *id.* at 39–40, 45–46, 49–51 (“What the poor lack is easy access to the [formal] property mechanisms that could legally fix the economic potential of their assets so that they could be used to produce, secure or guarantee greater value in the expanded market.”).

33. See Bernadette Atuahene, *Land Titling: A Mode of Privatization with the Potential to Deepen Democracy*, 50 *St. Louis U. L.J.* 761, 761 (2006) (defining “land titling” as phenomenon where governments give individuals ownership to land they occupy).

34. One reason that the phenomena of titling and registration are often conflated is that doctrines like adverse possession that award title to certain kinds of nonconsensual possessors can be used both to update defective registrations and to reallocate title to presumably better owners. A project that records titles of squatters—one of the central themes of Professor de Soto, *supra* note 26—thus simultaneously reallocates title and registers it.

Another representative example of the economic literature can be found in a series of recent articles by Professors Libecap and Lueck.³⁵ The articles stem from a large empirical study of land demarcation.³⁶ Professors Libecap and Lueck examine patterns of demarcation—essentially, the division of land into individual lots. In particular, they compare two demarcation systems that predominate in the United States: the rectangular system and the metes and bounds system.³⁷ Under the metes-and-bounds system, which is common to fifteen states, the boundaries of land parcels are marked by reference to landmarks or topographic features.³⁸ For example, a parcel may be recorded as extending from the riverbed on the south and the west to the peach tree orchard on the north and the brick wall on the east. The rectangular system, by contrast, relies on a grid formation comprised of uniform square lots, each of which is designated by a unique sector address.³⁹ A lot might be known as unit 115/93, where 115 and 93 are x - and y -coordinates on a map of a large area. Professors Libecap and Lueck's main finding is that the rectangular system is generally associated with higher land values.⁴⁰

While Professors Libecap and Lueck's work demonstrates the value of good information about property, it treats a very special case: where the information about the property is conveyed by the shape of the asset itself. Thus, although the focal point of their work is historical asset configuration—that is, how the land was physically divided into smaller parcels—Professors Libecap and Lueck's analysis contains only a veiled reference to land registries. In listing the advantages of the rectangular system, Professors Libecap and Lueck note the informational benefits of this system. Specifically, they assert that the rectangular system prevents strategic land grabs among neighbors by establishing clear information about parcel borders.⁴¹ More generally, they claim that the rectangular system “reduces potential for overlapping, conflicting claims; allows for a common address system[;] and importantly, lowers transaction costs, pro-

35. See, e.g., Gary D. Libecap & Dean Lueck, *The Demarcation of Land and the Role of Coordinating Property Institutions*, 119 *J. Pol. Econ.* 426, 428 (2011) (arguing rectangular system lowers costs incurred in enforcement of property rights, trading of property, and coordination for purposes of infrastructure investment, but at cost of inflexibility during demarcation of land boundaries).

36. See *id.* at 436–59.

37. *Id.* at 427.

38. See *id.* (“[The metes and bounds system] is decentralized, whereby each individual defines parcels independently and idiosyncratically [through reference to] nonstandard, impermanent [markers, such as trees, structures, and adjacent properties].”).

39. *Id.* at 427–28.

40. *Id.* at 428–29.

41. See *id.* at 453 (demonstrating rates of boundary disputes, entry disputes, and survey disputes were far higher when metes and bounds system used than with rectangular system).

moting land markets.”⁴² Like Professor de Soto, Professors Libecap and Lueck conflate titling and registration questions and pay little heed to the legal machinery that accompanies the land demarcation. They do not discuss recordation systems, or even the legal implications of the difference between registration and recordation.⁴³ Simply put, they do not distinguish between the form in which the law recognizes property rights and the form in which the state records them. Hence, the utility of their study for legal theorists is limited.

More generally, multiple economic theorists have championed what has come to be called, in economic parlance, an institutional approach to property. Both utilizing⁴⁴ and departing⁴⁵ from insights gleaned from the writings of Ronald Coase, institutional economic contributions proceed from the assumption that as long as transaction costs are sufficiently low, markets can be relied on to achieve an efficient allocation of resources.⁴⁶ On this vision, assets—or more precisely the legal rights to assets—gravitate through a series of voluntary transfers to their highest-value user. The initial allocation of resources is of limited importance since the market can “correct” misallocations. The important thing about the initial allocation is that it must clearly define the underlying assets and rights in them.⁴⁷ In other words, the initial allocation must satisfy certain informational minima necessary for the operation of markets.⁴⁸ The gist of this thread in the literature is captured by the following

42. Gary D. Libecap & Dean Lueck, *The Demarcation of Land and the Role of Coordinating Institutions* 12 (Nat'l Bureau of Econ. Research, Working Paper No. 14942, 2009), <http://ssrn.com/abstract=1401787> (on file with the *Columbia Law Review*).

43. We discuss the differences between recordation and registration in section III.A, *infra*.

44. E.g. Yoram Barzel, *Economic Analysis of Property Rights* 11–14 (2d ed. 1997) [hereinafter Barzel, *Economic Analysis*] (citing Professor Coase's focus on contract formation between value-maximizing individuals as “central to the property rights approach”); Benito Arruñada, *Property as an Economic Concept: Reconciling Legal and Economic Conceptions of Property Rights in a Coasean Framework*, 59 *Int'l Rev. Econ.* 121, 122–27 (2012) [hereinafter Arruñada, *Property as Economic Concept*] (applying Coasean framework to identify conflict between in rem property enforcement and transaction costs, and suggesting maintenance of public registry as viable solution to address this conflict).

45. E.g. Thomas W. Merrill & Henry E. Smith, *What Happened to Property in Law and Economics?*, 111 *Yale L.J.* 357, 360 (2001) [hereinafter Merrill & Smith, *What Happened to Property*] (critiquing Professor Coase's contribution to understanding of property as “cluster of in personam rights” which, according to the authors, hastened “demise of the in rem conception of property”).

46. Barzel, *Economic Analysis*, *supra* note 44, at 51–53 (asserting parties in market will attempt to adopt contract form that “generates the largest net output value”); Merrill & Smith, *What Happened to Property*, *supra* note 45, at 374.

47. Arruñada, *Property as Economic Concept*, *supra* note 44, at 121–22.

48. Professor Coase offered this observation himself. See R.H. Coase, *The Problem of Social Cost*, 3 *J.L. & Econ.* 1, 16 (1960) (“[T]he initial delimitation of legal rights does have an effect on the efficiency with which the economic system operates.”). As Professor Arruñada critically writes, this literature adopts “a simplistic view of Coase (1960), to see

two propositions: (a) information about entitlements lowers transaction costs; and (b) by lowering transaction costs and streamlining transactions between willing sellers and willing buyers, information makes entitlements *more* marketable and thereby increases their value.

Critically, this transactional perspective has grown to predominate the limited literature on registries. The work of Professor Arruñada is a case in point.⁴⁹ Professor Arruñada, arguably the most prolific scholar on registration and recordation systems, criticizes the work of his fellow economists—and even his own early work—for remaining “ignorant of property law,”⁵⁰ and in particular, for ignoring the in rem nature of property rights and for failing to distinguish them from contractual, in personam rights.⁵¹ In his work, Professor Arruñada meticulously distinguishes between property rights and contractual rights, but his perspective remains decidedly transactional. As he writes, the survival of property rights “after conveyance of the asset or any other transformation of rights requires costly institutions and resources in order to organize the process of searching, bargaining and contracting for consent.”⁵² Furthermore, the main problem on which Professor Arruñada focuses is that of asymmetric information between buyers and sellers and in particular, the risk of fraudulent transfers by sellers, which may lead to the creation of “hidden property rights.”⁵³ Professor Arruñada explains:

[T]he seller knows better than the acquirer about hidden property rights. More generally, the need of knowing which conflicting property rights exist, finding out who their right holders are, bargaining with such right holders to obtain their consent and contracting or somehow formalizing an agreement with them, all increase the costs of transforming and conveying rights.⁵⁴

The same transactional concerns animate Professor Arruñada’s other research in this area. For example, in another paper, Professor Arruñada points out the ability of rights registries to reduce transaction costs that attend rights transfers owing to their ability to reduce the need for expensive professional services that traditionally accompanied land

property as a mere bundle of use rights and to consider that these are strong if well defined, if their content is precisely delineated and they are clearly allocated to individuals.” Arruñada, *Property as Economic Concept*, supra note 44, at 132.

49. See, e.g., Benito Arruñada, *Institutional Foundations of Impersonal Exchange: Theory and Policy of Contractual Registries* 2–3 (2012) (assessing role of registries in reducing transaction costs of impersonal trade).

50. Arruñada, *Property as Economic Concept*, supra note 44, at 132 (quoting Dean Lueck & Thomas J. Miceli, *Property Law* § 5.1.1, in *1 Handbook of Law and Economics* 183, 187 (A. Mitchell Polinsky & Steven Shavell eds., 2007)).

51. *Id.*

52. Benito Arruñada, *Property Titling and Conveyancing*, in *Research Handbook on the Economics of Property Law* 237, 238 (Kenneth Ayotte & Henry E. Smith eds., 2011).

53. *Id.*

54. *Id.*

transactions.⁵⁵ Registries, by providing accessible and accurate information about rights in assets, lower search costs for acquirers and thereby reduce the need for the services of lawyers, public notaries, and licensed conveyers.⁵⁶

Surprisingly, a review of the legal literature reveals a paucity of recent theoretical articles on registration and communication of information about property rights. The most significant legal treatment of registration, which sets the stage for our analysis, can be found in a 1984 article by Douglas Baird and Thomas Jackson.⁵⁷ Professors Baird and Jackson begin their analysis with the observation that in ancient times, possession was the legal mechanism by which property owners informed the public of their rights.⁵⁸ Transfer of property rights without transfer of possession was considered a fraudulent transaction, null and void under the law.⁵⁹ The emergence of registration dramatically transformed the field of property law. Registration, Professors Baird and Jackson observe, affords property owners a cost-effective way to notify the public of their rights, which is critical for the operation of rights in rem.⁶⁰ The existence of a central registry, by publicizing property entitlements, affords owners a much greater degree of freedom with respect to rights transfers.⁶¹ Professors Baird and Jackson, two of the most prominent bankruptcy theorists of our time, illustrate this effect by discussing the ability of property owners to use their assets as collateral for loans.⁶² Indeed, since security interests are rarely possessory, registries can be central to the functioning of secured debt.⁶³ The more general point, however, is that registration adds value for owners by allowing them to engage in transfers of rights that they could not otherwise execute.⁶⁴ This phenomenon is what we dub the facilitating effect of information about property.

55. Benito Arruñada, Market and Institutional Determinants in the Regulation of Conveyancers, 23 *Eur. J.L. & Econ.* 93, 100–01 (2007) (identifying important ways in which registration system reduces transaction and search costs).

56. See *id.* at 102–04 (presenting empirical demonstration of registration faring much better than mere recordal of rights in lowering transaction costs such as fee paid for conveyancing services). Of course, the initial registration itself is not costless. See *infra* section II.B.2 (enumerating various initial costs of registration).

57. Douglas Baird & Thomas Jackson, Information, Uncertainty, and the Transfer of Property, 13 *J. Legal Stud.* 299 (1984) [hereinafter Baird & Jackson, *Information and Transfer*].

58. *Id.* at 302–03.

59. *Id.* at 302.

60. See *id.* at 304–05 (pointing out land ownership is ideal subject matter for implementation of recording systems).

61. *Id.* at 305–06.

62. *Id.* at 307–08.

63. See, e.g., Jonathan C. Lipson, Secrets and Liens: The End of Notice in Commercial Finance Law, 21 *Emory Bankr. Dev. J.* 421, 425–26 (2005) (explaining role of registries in perfecting security interests under UCC).

64. Building on this insight, Chagai Vinizky has recently advocated the creation of a registry for trade secrets. See Chagai Vinizky, Trade Secrets Registry, 35 *Pace L. Rev.* 455,

On this basis, Professors Baird and Jackson introduce their core thesis. They note the existence of a bidirectional relationship between the applicable legal regime and the informational environment concerning property rights. The legal system can greatly enhance disclosure of information about property rights by establishing registries and mandating registration of transfers. This, in turn, can increase the value of property rights.⁶⁵ However, since there is a cost to setting up and maintaining registries, it may not be beneficial to establish registries in all cases.⁶⁶ Hence, Professors Baird and Jackson's main goal is to specify the conditions under which registries are socially desirable.

Unfortunately, Professors Baird and Jackson do not offer a comprehensive analytical framework that allows us to assess the desirability of registries in all cases. Instead, they offer a series of discrete observations. Specifically, they argue that registries are unlikely to be cost effective when the rights in the underlying asset are subject to frequent transfers.⁶⁷ The authors speculate that a high rate of transfers necessitates frequent updating of the registry and that the cost of doing so may outweigh the benefits.⁶⁸ Professors Baird and Jackson also note that registries do not work cost effectively when it is impossible to identify the underlying asset with sufficient precision or at a sufficiently low cost. As an example, they consider the possibility of registering title in a particular grain of wheat.⁶⁹ More generally, it can be said that high demarcation and identification costs may outweigh the benefits of registries' information-forcing effects.⁷⁰ Finally, Professors Baird and Jackson posit that registries for personal property would be of limited use when they are geographically

457 (2014) (suggesting trade secrets registry would create value by reducing transaction and financing costs).

65. See Baird & Jackson, *Uncertainty and Transfer*, *supra* note 57, at 301 (arguing increases in available information about ownership create value by reducing risk for transacting parties).

66. *Id.* at 305.

67. *Id.* at 304, 306.

68. *Id.* at 306. Here, we feel obliged to remind our reader that Professors Baird and Jackson conducted their analysis at a time when digital databases and electronic updating amounted to science fiction. As in many other cases, registries provide another example of the interface between property and technology. Cf. Robert C. Ellickson, *Property in Land*, 102 *Yale L.J.* 1315, 1330 (1993) (stating "efficiency thesis predicts that innovations in technologies for marking, defending, and proving boundaries lead to more parcelization because they reduce the transaction costs of private property regimes" and leveraging example of barbed wire's effect on American West).

69. See Baird & Jackson, *Uncertainty and Transfer*, *supra* note 57, at 306–07 (remarking on difficulty of registering and discerning origins of siloed wheat and suggesting "[p]ossession is often more reliable than description in sorting between personal property").

70. Technology may lower such demarcation costs. See Abraham Bell & Gideon Parchomovsky, *A Theory of Property*, 90 *Cornell L. Rev.* 531, 565 (2005) [hereinafter Bell & Parchomovsky, *Property Theory*] (noting development of barbed-wire demarcation reduced costs of property protection).

restricted to a certain jurisdiction, say New York State, and the asset, say an automobile, can be easily moved to a different jurisdiction, say, California.⁷¹ This problem does not arise with respect to real estate.⁷²

The literature that is closest to our concerns has seen few contributions in the last seventy years. A 1938 study of registration systems by Richard Powell⁷³ prompted a series of articles arguing against Professor Powell's conclusions. Professor Powell had argued against expanded use of the Torrens land registry system—a registration system that offers greater protection to registered owners that we discuss in detail later in this Essay.⁷⁴ Torrens systems greatly increase the importance of land registration by making registration an almost undefeatable proof of title. Professor Powell argued that in providing state guarantees of title in land, the Torrens system did little more than place the state in the role of private title insurance companies, but at far greater expense.⁷⁵ Professor Powell thus argued that adopting a Torrens system of land registration would produce unnecessary costs with no real benefit.⁷⁶ Critics claimed that Professor Powell misread the data, and that Torrens land registry systems provided clear advantages to the public by giving potential purchasers guarantees of the legal validity of their acquisitions.⁷⁷ But Professor Powell's approach won the day. Torrens land registry systems are not widely used in the United States today.⁷⁸

Only a handful of works in recent decades have revisited the old debates. Together with several other co-authors, Thomas Miceli and C.F. Sirmans examined issues related to title searches and land title registries

71. Baird & Jackson, *Uncertainty and Transfer*, supra note 57, at 310 (“Automobiles, by contrast, which are not subject to a federal system, create problems when they are moved from one jurisdiction to another . . .”).

72. *Id.* (“Real property, by definition, never moves.”).

73. Richard R. Powell, *Registration of the Title to Land in the State of New York* (1938).

74. See *infra* section II.B.3 (examining impact of Torrens system in tightening alignment between assets and information in land registration).

75. Powell, supra note 73, at 42 (detailing costs and expenses involved in registration system); see also *id.* at 49–50 (estimating “cost of an initial registration is approximately twice the cost of an original policy of title insurance and approximately three times the cost of a ‘re-issued’ policy”).

76. *Id.* at 73.

77. See, e.g., Walter Fairchild & William Springer, *A Criticism of Professor Richard R. Powell's Book Entitled Registration of Title to Land in the State of New York*, 24 *Cornell L.Q.* 557, 558 (1939) (suggesting Professor Powell's account was unfair in its characterization of Torrens System); Myres S. McDougal & John W. Brabner-Smith, *Land Title Transfer: A Regression*, 48 *Yale L.J.* 1125, 1151 (1939) (finding Professor Powell's objections to Torrens system to be unjustified).

78. For an overview of the historic debates, as well as the U.S. experience with different registration systems, see generally Blair C. Shick & Irving H. Plotkin, *Torrens in the United States: A Legal and Economic History and Analysis of American Land Registration Systems* 1–23 (1978).

in the United States in a series of articles.⁷⁹ In one article, Professors Miceli and Sirmans provided an economic model to explain what they saw as the advantage of the Torrens system.⁸⁰ They argued that where transaction costs are high, a Torrens system can play an important role in allocating ownership to the higher value owner among claimants to title.⁸¹ In another article co-authored with Henry Munneke and Geoffrey Turnbull,⁸² Professors Miceli and Sirmans compared different recording systems for land in Cook County, Illinois. Their study showed that, all things being equal, land registered under a Torrens system is more valuable than land whose transactions are recorded under a competing system.⁸³ Joseph Janczyk similarly argued in favor of the Torrens system in an article claiming that the Torrens system would lower transaction costs enough to justify the costs of adopting a new Torrens registration system.⁸⁴ We revisit the topic of Torrens registration later in our Essay.⁸⁵ It should be noted, however, there are constant calls to establish new registries of intellectual property rights. Two representative examples include Chagai Vinizky's call for the adoption of a trade secrets registry⁸⁶ and Jorge Contreras's proposal to establish a registry of patent pledges.⁸⁷ Both scholars put forth very thoughtful and detailed blueprints for implementing each of the proposed registries.

B. *The Obstructive and Enabling Functions of Registering Information About Property*

As we showed in the previous section, theorists have focused primarily on the facilitating effect of registering information about property. That is, theorists have generally restricted their analyses of the value of registration to the positive effect registration has on easing transactions

79. See, e.g., Matthew Baker, Thomas J. Miceli, C.F. Sirmans & Geoffrey K. Turnbull, Optimal Title Search, 31 J. Legal Stud. 139, 139–40 (2002) (modeling costs incurred by would-be purchasers, through review of public records of land transactions, in trying to determine chain of title).

80. Thomas J. Miceli & C.F. Sirmans, The Economics of Land Transfer and Title Insurance, 10 J. Real Est. Fin. & Econ. 81 (1995).

81. *Id.* at 87.

82. Thomas J. Miceli, Henry J. Munneke, C.F. Sirmans & Geoffrey K. Turnbull, Title Systems and Land Values, 45 J.L. & Econ. 565 (2002).

83. *Id.* at 578 (“[P]roperty registered using the Torrens system will have a higher price than property recorded in the recording system.”).

84. Joseph T. Janczyk, An Economic Analysis of the Land Title Systems for Transferring Real Property, 6 J. Legal Stud. 213, 220–26 (1977).

85. See *infra* sections II.B.3, III.B.3 (considering mechanisms and effectiveness of Torrens systems).

86. See Vinizky, *supra* note 64, at 457 (advocating establishment of trade secrets registry).

87. See Jorge L. Contreras, Patent Pledges, 47 Ariz. St. L.J. (forthcoming 2015) (manuscript at 52–64) (on file with the *Columbia Law Review*) (describing contours of proposed registry for patent pledges).

between selling owners and voluntary buyers. In the remainder of this Part, we focus on the importance of the second and third functions of registries, which we term the “obstructive” and “enabling” functions, respectively. The registration of information about property rights critically affects not only the owner’s right to transfer but also her right to use the asset as well as her right to exclude.

We begin by briefly discussing the facilitative function and then proceed, in order, to the obstructive and enabling functions.

1. *The Obstructive Function.* — Registries’ facilitating function is easily described. The facilitating function of registries aids transfers insofar as registries constitute a reliable source of information about rights in assets. Once a registry for rights in specific assets is established and the public can access the information it contains, third parties can readily observe the nature of the rights in the underlying asset and the identity of the owner. For example, once a registry for artworks exists, anyone in the world interested in buying rights to a particular painting can easily verify that the seller is legally entitled to transfer the rights. As noted above,⁸⁸ this means that buyers enjoy greater security in their acquisitions and will therefore, presumably, pay more for the rights they acquire. This makes an owner’s ability to transfer rights more valuable, and therefore makes ownership of property rights in general more valuable.

But just as a registry conveys (and potentially certifies) information, it necessarily denies and discredits other information that is inconsistent with the information contained in the registry. Registries enable third parties to know who does *not* have rights in an asset. The following example is illustrative. Assume that Anne owns Blackacre in fee simple and that her rights are registered in her state’s land registry. Beatrice, a con artist, forges some legal documents pertaining to the legal rights in Blackacre and seeks to transfer her “rights” to Cecile. In this case, there is no information in the land registry reflecting Beatrice’s claimed rights. Cecile would have no problem learning that Beatrice has no legal rights to transfer; a quick look at the land registry would tell her as much. Just as the information in the registry facilitates potential transfers by Anne, it obstructs potential transfers by Beatrice. This obstructive function adds to the value of owners’ property rights as well.

Of course, the existence of the rights registry would deter Beatrice and like-minded parties from even attempting the illicit land transfer. By lowering the likelihood of success of some fraudulent transfers to virtually zero, the registries create a strong disincentive to tamper with many legal rights in land. This too results in greater security of ownership for the legal owners.

Obviously, this analysis is not confined to rights in land. Registries for rights in chattels have the same effect: They obstruct the ability of

88. See *supra* section I.A (outlining facilitative function of registries).

illicit possessors to transfer movable assets.

Consider a world where information about legal property rights in chattels cannot be reliably conveyed other than by possession. As Professors Baird and Jackson note, this is a good historical description of the world prior to registries.⁸⁹ Absent a registry of the rights to a specific chattel, possession is the best indicia of ownership. Historically, this is one of the reasons that possession is nine points of the law in property.⁹⁰ In the world without registries, third parties would have little choice but to rely on the fact of possession as the best evidence of ownership unless something aroused their suspicion. But possession is a highly imperfect proxy for ownership. Self-evidently, possession only coincides with ownership as long as the true owner maintains possession of her valuable assets. Once the owner surrenders her possession, either wittingly or not, there is no longer convergence between ownership and possession. This can happen voluntarily in the case of a bailment, pledge, or loan of the asset. It can happen involuntarily as well, as in cases of theft or fraud.

Importantly, from the vantage point of nonvoluntary takers, this state of affairs provides an incentive to grab possession of other people's valuables. When market transactions are strictly possession based, non-consensual takers can pass themselves off as legal owners simply by acquiring possession. Where the market for automobiles relies solely on the fact of possession to prove ownership, theft of possession of a car is a valuable way to achieve the benefit of car ownership, including the ability to use the car and to transfer it.

Registries do not eliminate all nonconsensual takings. Conversions for self-use can be valuable to thieves even without the possibility of future sales on the black market. In such cases, registries would diminish convertors' incentive to take only if the chattel is readily identifiable and its use is open and notorious, as in the case of a stolen automobile. Automobiles are easy to identify and it is difficult to drive them clandestinely. But smaller items like electric appliances present a very different case. Televisions, for example, cannot be identified readily and can be used in the privacy of a thief's home.

Registries are a much stronger deterrent in a second case: conversions of chattels for transfer to a different user. Here, the existence of a registry makes the underlying asset much less marketable in the hands of a thief. A registry allows potential buyers to ascertain the rights in an asset and abstain from transacting with nonregistered owners. For example, the establishment of a registry for bicycles or artworks dramatically reduces the size of the secondary market from the vantage point of

89. Baird & Jackson, *Uncertainty and Transfer*, supra note 57, at 302–03.

90. Douglas G. Baird & Thomas H. Jackson, *Possession and Ownership: An Examination of the Scope of Article 9*, 35 *Stan. L. Rev.* 175, 180–81 (1983) (mapping legal terrain dealing with preferential treatment of certain nonpossessory interests over secured interests with respect to same property).

thieves. Cautious purchasers would always turn to the registry to check the identity of the rightful owner.

Naturally, some buyers would agree to transact with a thief for the “right” price. Hence, registries cannot completely wipe out nonconsensual takings of movable property. But even here, they clearly dampen the incentive to engage in nonconsensual appropriations for three reasons. First, as we already noted, registries eliminate the prospect of transacting with an honest buyer. This in turn ought to have a negative effect on the price a thief can charge. The lower the price, the smaller the expected return on thievery, which reduces the lure of the activity relative to legitimate alternatives. Second, registries increase the likelihood of apprehension and punishment. In a world with effective registries, illicit possessors cannot present the stolen good to potential buyers without risking being reported to the authorities. In the presence of this risk, convertors have to expend considerable resources on screening purchasers, which further erodes their profit margin. Third, and finally, dishonest purchasers who are willing to transact with thieves should face the same costs if they try to resell the chattel in the future. For all these reasons, potential purchasers would be willing to pay less for the item.

The combination of these factors makes registries valuable for property owners, even where the owners have no plans to transfer title to the asset.

Registration is a relatively simple and inexpensive act.⁹¹ Yet it provides property owners with effective protection against nonconsensual takers and thereby enhances the value of the objects in their hands. In the absence of a registry, property owners might be forced to engage in duplicative expenditures to protect their possession. And the best alternative means may often be much more expensive and much less effective.

It is important to note that while the obstructive function of registries has drawn less scholarly attention than the facilitative function, there have been a handful of important works that have noted its existence and importance. Perhaps the outstanding example is found in Professor Shavell’s description of registries in his sweeping *Foundations of Economic Analysis of Law*.⁹² Professor Shavell describes “discourag[ing] theft” as one of the two principal virtues of registration systems, and he notes that the presence of a property registry reduces the ability of the thief both to use and to transfer the property.⁹³ However, Professor Shavell adds a curious note of skepticism, arguing that individual owners are unlikely to consider the value of deterring thieves in considering

91. This is not to say that registration is costless. See *infra* section II.B.2 (illustrating potential costs of registration in IP context).

92. Shavell, *supra* note 9, at 47–48.

93. *Id.*

whether to register ownership in a particular asset, given that the marginal deterrence for a single registration is quite small.⁹⁴

2. *The Enabling Function.* — Knowledge about title to property comes into play in more than just transactions. Obviously, title information is vital both to potential buyers of assets and to their potential nonconsensual takers. Less obviously, but no less vitally, knowledge about title is necessary for owners to enjoy the benefit of their property rights. An heir who has no knowledge of her newly inherited rights has no ability to enjoy the property, either directly or by transferring it to another. Registries can fill the role of informing owners of their rights and thereby enable owners' use of their property. Registries thus fulfill an *enabling* function, in parallel with their obstructive and facilitative functions. High profile cases—such as lost assets of the survivors of the Holocaust⁹⁵—provide outstanding examples of the enabling function of property registries.

There are many other examples. For instance, since there is no registry of lost chattels, owners will find it virtually impossible to locate their lost goods. Aware of this fact, owners of lost property often decide to forego the cost of searching for their goods. Of the many attractions of Alabama, one stands out (at least for our purposes): the Unclaimed Baggage Center, advertised under the slogan “You Never Know What You’ll Find.”⁹⁶ As many as 68,000 suitcases and luggage items are never picked up every year and if they remain unclaimed for ninety days, most airlines sell them to the Unclaimed Baggage Center.⁹⁷ These items represent only a small fraction of the universe of lost chattels. There can be little doubt that if a central registry for lost items existed, many owners, with the aid of new search technologies could reunite with their lost chattels.

Consider, as well, copyright registries. Registration is not a prerequisite for securing copyright protection; it is merely a precondition for filing an infringement suits. As a result, many expressive works that are not involved in litigation are never registered. Since copyright protection remains in effect seventy years after the death of the author,⁹⁸ many legal heirs and devisees may never learn of their rights under the Copyright Act. The existence of a more comprehensive registry that covered all copyrighted works would greatly assist authors' heirs and devisees in

94. *Id.* at 48–49.

95. See *supra* note 6 and accompanying text (suggesting property registries might have alerted heirs to the existence of such assets).

96. Unclaimed Baggage Ctr., <http://www.unclaimedbaggage.com/> [<http://perma.cc/SK4T-4WAW>] (last visited Sept. 18, 2015).

97. Terry Maxon, Alabama Store Is Last Stop for Lost Luggage, *Dall. Morning News* (May 4, 2011, 9:41 PM), <http://www.dallasnews.com/business/airline-industry/20110504-alabama-store-is-last-stop-for-lost-luggage.ece> [<http://perma.cc/DGA7-PJK4>] (last updated May 5, 2011, 9:21 AM).

98. 17 U.S.C. § 302(a) (2012).

becoming informed of their rights. Indeed, the problem of owners not knowing their copyright rights is acknowledged as a contributing factor to the problem of “orphan” works.⁹⁹

At the same time, such examples illustrate the difficulty registries have in enabling owners’ use of their assets. Simply put, registries are not self-executing. Registries in the modern world do not provide information to interested parties automatically. Registries reveal their information only upon being searched. When owners do not suspect that they own assets, there is little reason for them to start searching the various registries around the world that may reveal some hidden ownership. It is for this reason that self-appointed heir hunters,¹⁰⁰ and other detectives who seek unknowing owners, are able to collect such high fees for their services.

The enabling function of registries should not be dismissed, however. In the information age, search protocols are improving and greater quantities of information are becoming available. It is not difficult to imagine a day in the not-distant future when individuals will be able to program repeated searches in multiple registries for assets of which they may have lost track or about which they might never have known.

C. *Measuring the Informational Value of Property Registration*

It is not surprising that empirical studies of the value of property registration are few and far between. As we have noted, there is little writing directly on the question of the value of information about property rights.¹⁰¹ However, those empirical studies that have been conducted seem, in the main, to reinforce our theoretical claims about the facilitative and obstructive value of property registrations.

99. In the United States, a study conducted by Carnegie Mellon found that twenty-two percent of copyrighted works were orphan works. Carnegie Mellon Univ. Libraries, Reply Comment in Response to Notice of Inquiry about Orphan Works 3 (2005), <http://copyright.gov/orphan/comments/OW0537-CarnegieMellon.pdf> [<http://perma.cc/53P3-437A>]. A 2010 report written for the European Commission estimates the number of orphan copyrighted works in Europe at three million books (or thirteen percent of all in-copyright works). Anna Vuopala, European Comm’n, Directorate Gen. Info. Soc’y & Media, Assessment of the Orphan Works Issue and Costs for Rights Clearance 5 (2010), http://www.ace-film.eu/wp-content/uploads/2010/09/Copyright_anna_report-1.pdf [<http://perma.cc/FP8N-8GCC>]. A 2011 report by the British Library suggested that the percentage of orphan works may be as high as forty-three percent. Press Release, British Library, Electronic Clearance of Orphan Works Significantly Accelerates Mass Digitisation (2011), <http://www.bl.uk/press-releases/2011/september/electronic-clearance-of-orphan-works-significantly-accelerates-mass-digitisation> [<http://perma.cc/Y47R-KEXK>].

100. See *supra* note 7 and accompanying text (noting utility of heir hunters in realigning assets with ownership information).

101. See *supra* Introduction (assessing prior scholarship on intersection between property and information).

Professor de Soto's empirical work on formalization of legal rights in property may provide a crude measure of the added value registration creates for land owners. Professor de Soto famously estimated that in Peru alone there is a loss of \$74 billion in what he calls "dead capital."¹⁰² The loss stems from the fact that when property rights are not formally recognized by the state they cannot be used by the owners to raise capital via securitized transactions. In the legal world, formalization of rights in land and registration typically go hand in hand as a practical matter. However, analytically, the two concepts are distinct. It may very well be that in the cases studied by Professor de Soto, most of the benefit would accrue to owners from formalization, irrespective of registration. Hence, one cannot cleanly translate Professor de Soto's studies into proof of the value of registration.

Additionally, subsequent empirical research has called into question some of Professor de Soto's predictions about the benefits associated with titling. For example, Jean-Philippe Platteau, who studied land titling in sub-Saharan Africa, argued that the expected benefits from land titling were overestimated¹⁰³ and that it is far from clear that they outweigh the costs.

In short, so long as studies conflate titling efforts with registration, it is very difficult to prove empirically the facilitative effects of land registries. In addition, there are often other confounding factors that affect land values at the same time as registration, in particular since the benefits of land registries are often fully realized years after the initial registration, making them hard to track.¹⁰⁴ It is not surprising that economists¹⁰⁵ and the World Bank¹⁰⁶ have emphasized the need for empirical work on the long-term effects of registries.

102. De Soto, *supra* note 26, at 31 ("The value of extralegally held rural and urban real estate in Peru amounts to some \$74 billion."). De Soto's figures have been disputed. See Kevin E. Davis, *The Rules of Capitalism*, 22 *Third World Q.* 675, 678 (2001) (reviewing Hernando de Soto, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* (2000)) (calling de Soto's findings "provocative" but lamenting his figures "are presented in such a cursory fashion that at times it is difficult to derive any sense of how they were produced"); Jim Thomas, *Hernando de Soto's The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*, 34 *J. Latin Am. Stud.* 189, 189–90 (2002) (book review) (questioning methodologies employed by de Soto in valuing dead capital); Christopher Woodruff, *Review of de Soto's The Mystery of Capital*, 39 *J. Econ. Literature* 1215, 1220–22 (2001) (book review) ("[T]he data available in the book's appendix suggest that \$9.24 trillion is an exaggerated estimate [of the value of developing countries' untitled real estate].").

103. Jean-Philippe Platteau, *The Evolutionary Theory of Land Rights as Applied to Sub-Saharan Africa: A Critical Assessment*, 27 *Dev. & Change* 29, 74–75 (1996).

104. See de Soto, *supra* note 26, at 46–47 (explaining mystery of capital's successes to be shrouded in thousands of legislations, regulations, and institutions that govern recording system and render effects difficult to observe).

105. See, e.g., Grenville Barnes, *A Comparative Evaluation Framework for Cadastre-Based Land Information Systems (CLIS) in Developing Countries 3* (Land Tenure Ctr., Research Paper No. 102, 1990), <http://minds.wisconsin.edu/handle/1793/34180> (on file

The need for empirical work is particularly striking when it comes to obstructive effects. There has been no theoretician with the stature of Professor de Soto to take on the question of property information on thieves, so it is no surprise that no systematic examination of the magnitude of obstructive effects is to be found. Nonetheless, there are some tantalizing hints that the obstructive effect may be significant.

Some locales, such as Lane County, Oregon, have reported a reduction in boat theft incidents as well as an impressively high recovery rate thanks to the establishment of a boat registry intended to reduce the number of boats thefts. According to the County Sheriff, "Boat theft reports in Oregon are the lowest in decades, and the recovery rate for stolen boats is at an all-time high."¹⁰⁷ Impressively, the recovery rate in Lane County is roughly a third, which is two or three times higher than the national recovery rate that stands at ten to twenty percent.¹⁰⁸

Several European countries have launched stolen-phone databases in order to reduce the rate of cellphone theft in large cities. In the United Kingdom, the measure is credited with a twenty percent reduction in cellphone-related crime (from 10,000 cases to 8,000) between 2004 and 2012 even though the number of cellphones nearly doubled in that period.¹⁰⁹ The perceived success of the registry has prompted calls to force cellphone providers in the United States, where cellphone-related crime has gone up in recent years, to adopt a similar measure.¹¹⁰

But the most detailed data on what we term the obstructive function of registries comes from Norway. Bicycle theft has become so widespread in Norway that stolen bicycles have become a currency of exchange among thieves.¹¹¹ In the early 1990s, the number of thefts skyrocketed to 100,000 per year, and stolen bicycles were resold for five to ten percent of

with the *Columbia Law Review*) ("Evaluation efforts have been frustrated by problems related to the inappropriate documentation of existing systems and the absence of effective evaluation models.").

106. Cf. Nicholas H. Stern, Foreword to Klaus W. Deininger, World Bank, *Land Policies for Growth and Poverty Reduction*, at ix, ix (2003) ("[D]iscussions on land policies are often characterized by preconceived notions and ideological viewpoints rather than by careful analysis of the potential contribution of land policies to broader development . . .").

107. Owners Can Reduce Boat Theft with Basic Steps, Lane Cty., Or., <http://lanecounty.org/Departments/Sheriff/PoliceServices/Pages/stolenboats.aspx> [[http://perma.cc/\\$H37-MV6J](http://perma.cc/$H37-MV6J)] (last visited Sept. 18, 2015).

108. *Id.*

109. Rolfe Winkler, Carriers Band to Fight Cellphone Theft, *Wall St. J.* (Apr. 9, 2012, 10:52 PM), <http://on.wsj.com/HYwctV> (on file with the *Columbia Law Review*).

110. See *id.* (discussing success of United Kingdom program and noting calls for similar registry programs to be implemented in United States and Canada).

111. Bicycle Theft in Norway, http://www.sykkeltveri.no/bicycle_theft.html [<http://perma.cc/4PFA-39PF>] (last modified May 28, 2005, 9:13 AM).

the original price.¹¹² Following the implementation of a related registry, the annual number of stolen bikes in Norway fell from 100,000 in 1995 to 60,000 in 2004.¹¹³ The bicycle thefts reported to the police were reduced from 26,577 to 19,141.¹¹⁴ The thefts reported to the insurance industry were reduced from 18,100 to 9,468, and their losses were reduced from NOK 70.8 million (roughly USD 12 million) to NOK 34.0 million (less than USD 6 million).¹¹⁵

While the data is far from definitive, it does provide tentative support for the existence of positive facilitative and obstructive effects in property registries.

II. REGISTRY STRATEGIES AND THE INFORMATION-ASSET PARADOX

In Part I, we showed that registries function in multiple markets simultaneously. Registries add value to property rights by *facilitating* transactions in licit markets and by *obstructing* transactions in illicit markets.

A complementary feature of registries elaborated in this Part is that they inspire a tug-of-war among different market participants as they repeatedly take action to protect their ability to enjoy property benefits. Owners want the registries that best preserve their rights in order to best facilitate licit transactions and obstruct illicit transactions. Thieves and other nonconsensual takers, by contrast, want registries that fail to preserve the rights of owners. In particular, thieves desire registries with the smallest obstructive effect on illicit transactions. The contradictory motivations of owners and nonconsensual takers engender dynamic effects that have generally been overlooked by the extant scholarly literature. The information contained in registries drastically affects the ability to enjoy the benefits of property. Consequently, registries' information shapes the behavior not only of owners and potential buyers (and other consensual users and possessors), but of all the private actors in the property universe, including potential nonconsensual takers and users. Each set of parties seeks to manipulate the information to its advantage.

It might seem that this observation adds little to our normative understanding of the regulation of information about title in property. On first impression, it appears that the conflict of interests between lawful owner and thief simply points toward the desirability of better registries with better verified data. Surprisingly, we show that this is not the case. Registries with better data do not necessarily have the greatest obstructive effect on illicit markets, and they may not result in the greatest property value. In some cases, the better the registry's data, the greater the danger to the registered asset. This is because both owner and thief

112. Id.

113. Id.

114. Id.

115. Id.

are not necessarily interested in the fidelity of the information in the registry *per se*. Rather, both are interested in the degree to which the asset aligns with information about the asset and its owner.

Consider, first, cases where information and asset are not stably aligned, or where thieves and other nonconsensual takers can reliably control either information or the configuration of an asset. For example, consider a registry for boats, where the registry records the ownership of every boat by an identity number built into the frame of every boat in nonremovable fashion. In this case, information and asset are stably aligned. However, imagine as well that the registry is maintained in a computer database that enjoys only minimal security and can be easily hacked. In this case, owners would realize little or no obstructive value from registries, and registries provide little or no additional stability in ownership.

Conversely, if information and asset are stably aligned, and the owner can also reliably control both information and the configuration of an asset, owners can enjoy the greatest obstructive value of registries and therefore the greatest value in their assets.

There is an important asymmetry here, however. For owners to enjoy the obstructive value of registries, they must ensure fidelity of all elements. For thieves, one weak link is enough. For instance, in our boat example, the weak link in the lack of database fidelity is enough to undermine the value of the registry for the owners. Paradoxically, the high quality of the information in the database will actually help the thieves. The comprehensiveness of the registry will make it easier for thieves to steal boats and sell them to third parties, as they can do so simply by tampering with the ownership data in the registry without ever taking possession of the vessel.

Other times, where the identifying information can be easily removed from assets, the existence of the registry actually encourages nonconsensual takers to undercut the alignment between asset and information by defacing one or the other. Thus, in some cases, registries *encourage* destruction of valuable attributes of assets or information about them.

The surprising result of this is that good registries can sometimes lead to adverse property results. We call this dynamic “the information–asset paradox.” Unraveling this paradox, and understanding when and how registries help property value requires a close examination of the dynamic effects of registries. The existence of registries encourages both owners and potential takers of the property rights (whether consensual or nonconsensual takers) to play close heed to the relationship between information and asset. Unfortunately, since different actors have different aims—owners, for example, want a close and stable relationship, while thieves do not—the different actors constantly compete to secure or upset the relationship between registered information and the under-

lying asset. By examining the actions likely to be taken by both sides in this contest, we can understand the dynamic effects of registries and better analyze the utility of registries.

In this Part, we explore the competing strategies of owner and non-consensual takers, and explain the likely effects on information, asset, and the alignment between information and asset. We conclude this Part by noting the possibility that the roles (and corresponding strategies) of owners and nonconsensual takers may be flipped in some common and foreseeable circumstances.

A. *Strategies of Nonconsensual Takers*

For potential thieves, the world consists of many assets to which the thief has no legal right but that can nevertheless serve as a potential source of utility. A thief who looks at a car parked on the street, for instance, sees potential utility in joyrides (or other potential direct uses of the car by the thief) or in profits in fencing the car (i.e., the profits that can be realized by selling possession of the car in the market for stolen goods). The economic literature on property rights views such potential utility as an illicit but important component of the utility of “economic property rights.”¹¹⁶ Thieves can realize some of the utility of assets, and the utility that they can realize must be taken into account.¹¹⁷

Of course, this is not something the authors view in a positive light. Society does not aim, and should not aim, to aid thieves.¹¹⁸ But undesirable though it may be, the potential utility of thieves is important because it affects the stability of licit property rights. Society must pay attention to the utility of thieves because the *disutility* of thievery is an important social aim.¹¹⁹ The less utility a thief is likely to realize from any given asset, the less likely he or she is to attempt to steal it. In turn, the more security enjoyed by the licit owner of property rights in an asset, the more the property rights are worth.

In a world where registries provide readily available information about the legal provenance of an asset, would-be thieves (and other non-consensual takers of assets) face an uphill battle. First, registries make it

116. See Barzel, *Economic Analysis*, supra note 44, at 141–42 (using example of theft to illustrate distinction between economic and legal rights); Yoram Barzel, *The Capture of Wealth by Monopolists and the Protection of Property Rights*, 14 *Int'l Rev. L. & Econ.* 393, 394 (1994) (defining economic rights in terms of ability to derive utility from property rather than in terms of legal entitlement).

117. See Barzel, *Economic Analysis*, supra note 44, at 3–4 (noting lack of legal rights reduces but does not negate ability to derive economic utility from stolen goods).

118. Cf. Bell & Parchomovsky, *Property Theory*, supra note 70, at 571–72 (“The point and purpose of property law is to separate rightful owners from unlawful claimants . . .”).

119. Cf. Eduardo Moisés Peñalver & Sonia K. Katyal, *Property Outlaws*, 155 *U. Pa. L. Rev.* 1095, 1098–104 (2007) (arguing property outlaws have enabled reevaluation of distribution and content of property entitlements and cautioning law should therefore be careful not to overdeter nonviolent refusals to abide by existing property arrangements).

far more difficult for thieves to dispose of stolen items. Would-be buyers can consult registries and verify that the selling thief has no title to convey. Second, registries can make it more difficult for the thief to utilize the item on his or her own. The item might be recognized as stolen, and the thief might be exposed. For instance, a thief who joyrides in a car may get caught if observed by a police officer who compares the license plate number to the information in a registry of stolen cars.

Realizing this, thieves can take precautionary measures to protect the utility they expect to realize from their illicit trade. Thieves need only worry about getting caught if information is readily available and verified, and if the information is likely to compromise the thieves' expected gain. This means that thieves can protect their expected utility by blunting the expected adverse effects of truthful information. Thieves can take measures to reduce the likelihood of getting caught by creating mismatches between the description of assets in registries and their appearance in the real world. This can be achieved by changing the defining characteristics of the asset or by manipulating the information in the relevant registry.

Concretely, nonconsensual takers employ three strategies to compromise the value of registries to owners. The first is to reconfigure the assets themselves in order to cause misalignment between the new form of asset and the information about the assets in their old form. One example of this strategy is the operation of "chop" shops, where cars are dismembered into spare parts that are then sold separately as "scrap." Jewelry thieves may employ a similar strategy when they melt down their stolen pieces into precious metals.

To fully appreciate the implications of asset reconfiguration, consider recent initiatives around the world to establish registration systems for smartphones to combat rampant theft of these devices.¹²⁰ At first blush, the case for a cellphone registry appears indisputable. Smartphones bear identification information and can be easily disabled by their manufacturers. However, the possibility that thieves may reconfigure the stolen phones renders the analysis much more complicated and nuanced. Registration, even when coupled with remote disabling of the device, will not put an end to smartphone theft as long as thieves can turn a profit from taking the devices apart and selling the electronic

120. Such a registry was recently launched in Canada. See Ellen Roseman, *New Registry Lets You Spot Stolen Phones*, *Toronto Star* (Oct. 1, 2013), http://www.thestar.com/business/tech_news/2013/10/01/new_registry_lets_you_spot_stolen_phones_roseman.html [<http://perma.cc/8S8A-M5HP>] (detailing Canada's telephone registry program). In the United States, private companies considered adopting a similar solution. See *Thefts of Cell Phones Rise Rapidly Nationwide*, *USA Today* (Oct. 20, 2012), <http://www.usatoday.com/story/tech/2012/10/20/thefts-of-cell-phones-rise-rapidly-nationwide/1646767> [<http://perma.cc/96AA-Q4QC>] (citing expectation carriers would in near future launch individual databases allowing consumers to report stolen cell phones and have them disabled).

components individually. Indeed, a comprehensive registration system would drive nonconsensual takers toward this strategy, making it virtually impossible for smartphone owners to retrieve their valuable devices.

Of course, the manufacturers of smartphones and other electronic goods can decrease the profitability of this strategy by making it very difficult to take apart their devices. In the extreme, they can manufacture fully integrated devices that cannot be dismembered. But this would create a second-order cost for rightful owners: It would dramatically increase the cost of repairs. At the end of the day, therefore, any decision regarding the desirability of a smartphone registry requires policymakers to adopt a *dynamic* perspective that takes account of the full range of responses of consensual nontakers to the establishment of a registry.

The second strategy employed by nonconsensual takers is to obscure the alignment between goods and information attesting to the legal rights in them. For instance, a car thief may replace the license plates of a car in order to cause law enforcement officers to misidentify the vehicle. Thieves, in fact, routinely remove identifying numbers from stolen cars in order to reduce the possibility of matching the registry to the stolen asset.¹²¹

The third strategy, and the most difficult for nonconsensual takers to employ, is to leave the asset and registry information about the asset intact, but to attempt to utilize the information in the registry to take control of ownership. In one version, nonconsensual takers may attempt to rewrite entries in the registry to show that they are the true owners. For instance, modern bank robbers may try to effect heists through entirely electronic means. Instead of physically entering a bank and demanding cash, the thieves may seek to hack into the data registry of accounts and reassign to themselves apparent ownership of assets that belong to others. Such electronic thefts, unfortunately, are possible in even the most sophisticated data systems. For instance, thieves in the European Union were recently able to hack into a Czech registry of carbon-dioxide emission allowances and reassign the rights to make it appear that they lawfully possessed allowances.¹²²

In a different version of this strategy, instead of hacking the registry to change information about the owners, the nonconsensual takers attempt to masquerade as the owners. The popular and dangerous fraud

121. See Edward R. Kleemans, *Organized Crime, Transit Crime, and Racketeering*, 35 *Crime & Just.* 163, 191–92 (2007) (explaining modus operandi of criminal organizations involved in illicit trafficking of stolen cars).

122. See Nathaniel Gronewold & John J. Fialka, *European Commission Halts Transfers of Carbon Emissions Allowances Until Thefts Are Sorted Out*, *N.Y. Times* (Jan. 20, 2011), <http://www.nytimes.com/cwire/2011/01/20/20climatewire-european-commission-halts-transfers-of-carbo-22394.html> (on file with the *Columbia Law Review*) (reporting suspension of transfers of carbon-dioxide emission allowances pending investigation of “computer-aided thievery [resulting in] the loss of 475,000 [emissions allowances] from a registry in the Czech Republic”).

known as “identity theft” involves nonconsensual takers appropriating enough personal information about an individual victim to allow themselves to convince keepers of registries, such as banks and credit card companies, that the takers are actually the individual in question.¹²³ The identity thieves then use the false identities to obtain assets registered in the name of the victims.¹²⁴

Before concluding our analysis of nonconsensual takers’ strategies, we should note that none of these strategies is cost free, and costs will alter the choices of nonconsensual takers.

We begin with the cost structure of nonconsensual takers’ illicit activity. No matter what the nonconsensual takers do to improve their chances of successful appropriation, they will have to invest some time, effort, or expense. Disfiguring assets can reduce the usefulness of the assets—the parts of a car, for instance, while still valuable, are generally less valuable than a fully functioning automobile—and demand expertise in the defacing. Forging informational interfaces, such as automobile licenses or certificates of authenticity, demands expertise and care. Hacking into databases may require a great deal of expertise and time.

Sometimes, these costs will be so large as to decisively protect the asset from theft. In some cases, these costs will deter thieves from taking items nonconsensually because the theft is no longer cost effective, or because similar items may be stolen at less cost. But in other cases, nonconsensual takers may still find theft worthwhile, notwithstanding the cost. Just as significantly for our purposes, the costs may be uneven, pushing nonconsensual takers to adopt a less costly strategy. For instance, where information is very secure, but the physical asset less so, thieves may find themselves increasingly interested in reconfiguring assets. The more secure car ownership databases are, the more attractive “chopping” cars is to thieves. Registries will therefore have uneven deterrence effects on illicit activities. Sometimes, instead of deterring theft, registries will just drive illicit activities into different channels.

Indeed, in some cases, paradoxically, registries may increase certain kinds of illicit activities. This is because registries may make illicit possession look secure to buyers. When potential buyers examine the providence of ownership, they do so on the basis of the information they have. If ownership information is recorded in registries, potential buyers will generally rely on the information in registries to determine whether the seller is genuine. If thieves can take control of the information in the

123. See Penelope N. Lazarou, *Small Businesses and Identity Theft: Reallocating the Risk of Loss*, 10 *N.C. Banking Inst.* 305, 308–09 (2006) (surveying multiple ways in which such identity thefts occur).

124. See Identity Theft, Dep’t of Justice, <http://www.justice.gov/criminal/fraud/websites/idtheft.html> [<http://perma.cc/2ASW-NL38>] (last updated Nov. 2, 2015) (listing ways in which thieves can leverage misappropriated identifying information to obtain assets in victims’ names).

registry, they can make their control of an asset look legitimate, and thereby enjoy the benefits of the registry's facilitating function.

B. *Strategies of Owners*

Owners are not left without recourse when faced with the threat of strategic behavior by potential nonconsensual takers. They, too, can take steps to protect their rights. Owners have one great advantage over thieves: The law is on their side. As a result, owners can rely on the state to spread information about their licit rights through state-provided registries and also rely on other state-provided protections. But even without the assistance of state-provided registries, owners may take steps to protect their rights. In fact, the primary strategies for owners will be the opposite of nonconsensual takers. Owners will try to secure a stable alignment between registered information and legal rights, the accuracy of information about owners' rights, and a favorable configuration of assets.

In this section, we do not assume the existence of registries. Rather, we look at how owners might try to protect themselves, both in the presence and in the absence of registries. In the next section, we look at the way the owners' strategies interplay with one another, particularly when there are registries recording property rights. We do this in order to highlight the separate roles of the owner in recording information and of the state in facilitating such recording.

1. *Reconfiguring Assets.* — In the preceding section, we discussed how *thieves* change the makeup of assets in order to reduce the risk of apprehension.¹²⁵ In this section, we show that *owners*, too, employ a similar strategy. However, there is a critical difference between the two cases: thieves reconfigure assets *ex post*, after the theft; owners do so *ex ante* to prevent theft.

By reconfiguring their assets, owners can make them less attractive to illicit takers. For instance, owners may prefer that automobile stereos be electronically coded so that they can only operate while connected to the correct automobile. Likewise, owners of bicycles may prefer versions that do not have "quick release" parts so as to prevent thieves from stealing pieces of the bicycle.

The owners' interest in blocking thieves may lead to an extreme and counterintuitive strategy for configuring assets: damaging their own goods or acquiring lower quality goods *ab initio*. In his classical article, *The Rhino's Horn: Incomplete Property Rights and the Optimal Value of an Asset*,¹²⁶ Professor Douglas Allen compiles examples of cases in which this strategy may be employed.

125. See *supra* section II.A (setting forth strategies and incentives of nonconsensual takers).

126. Douglas W. Allen, *The Rhino's Horn: Incomplete Property Rights and the Optimal Value of an Asset*, 31 *J. Legal Stud.* S339 (2002).

Professor Allen's article was inspired by the plight of the black rhino in Africa. Poachers have driven the population of the black rhino to the point of extinction, leading conservationists to think of possible solutions to save the animal. Tragically, poachers are not interested in the rhinos in their entirety. They hunt the rhinos down for one reason only: the rhino's horn. As it turns out, the horn can be used for the manufacturing of various functional and ornamental objects, and legend has it that the horn has various medical and spiritual properties.¹²⁷ Poachers who are indifferent to the fate of rhinos kill the rhinos solely in order to saw off the horn. The rhino's horn thus became the bane of the black rhino's existence.¹²⁸ Professor Allen and others suggested that the black rhino could be saved if its horn were surgically removed by environmental organizations.¹²⁹ The rhino can easily survive without its horn—indeed, it is of very little use to it—but in the sad reality that emerged in Africa, the rhino cannot survive with it.¹³⁰

This observation led Professor Allen to a more general insight. Property owners may be better off damaging or compromising their own assets if by doing so they make them less attractive to thieves.¹³¹ Two examples illustrate this possibility. The first is the removal of stereo systems from cars by owners, or, in some cases, the installation of inferior-quality stereos. Owners find this damage to their own utility worthwhile when the car will be parked in areas where car-radio theft is rampant. By installing a cheap stereo, the car owner compromises the enjoyment she derives from driving the car. However, this reduction in utility is outweighed by the utility of being secure in the knowledge that her radio will not get stolen and that her car will not be damaged in the process.

A second example is bicycles. Multiple students in urban campuses choose to ride average and even below-average-quality bicycles in order to avoid falling prey to the predation of bicycle thieves.¹³² In this case,

127. See *id.* at S348 (“Although the horn is used to decorate ceremonial dagger handles in the Middle East, its chief use is in Asian medicine, where it is ground into a powder for the relief of fevers.”).

128. See *id.* at S349 (“[B]lack rhinos numbered between 65,000 and 100,000 in 1970; today, population estimates are between 3,000 and 4,000.”).

129. *Id.*

130. See *id.* at S348–50 (“Dehorning . . . does not hurt the rhino . . . and it appears that the policy has reduced poaching.”).

131. See *id.* at S347–48 (suggesting such actions are rational where “costs of enforcing the property right decrease by more than the value of the property right”).

132. Riding cheaper, used bicycles is an effective way to avoid bicycle theft. See Frederika Whitehead, *Bike Thief Tells How to Stop Your Cycle from Being Stolen*, *Guardian: Green Living Blog* (Sept. 13, 2010, 2:00 AM), <http://www.theguardian.com/environment/green-living-blog/2010/sep/13/bike-thief-stolen-tips> [http://perma.cc/D7S5-GKCN] (recommending bicycle owners buy cheaper bikes because bicycle thieves frequently target expensive bikes and monitor locations where expensive bikes are regularly parked).

too, the owner voluntarily agrees to give up a certain level of enjoyment in exchange for greater security of possession.

The rationale behind the owners' actions in both cases—the car stereo case and the bicycle case—is the same. The sacrifice made by the owner, while diminishing the value to her, effects an even greater diminution of value to a potential thief.

Asset configurations that foil thieves need not be extremely harmful to the owner. Many times, assets are structured to have simple security systems that owners can manage more easily than thieves. Automobiles have keys and sometimes electronic codes. Computers and telephones can be programmed to operate only after the entry of a password.

Sometimes, asset configurations are designed to protect the integrity of registrations. Cellular telephones, for instance, may have identification numbers coded into the software so that stolen cellphones can be identified.¹³³ Vehicle identification numbers (VINs) are placed in automobiles in multiple locations in order to ensure that the numbers cannot be easily removed.¹³⁴ These methods do not directly affect the functioning of the asset. The car drives in exactly the same fashion no matter where, and in how many locations, the VIN is located. However, the more secure the VIN, the harder it is to separate the asset (the automobile) from the information that is the key to successful registration (the VIN).

2. *Managing Information.* — Aside from minding the configuration of assets themselves, owners can take other steps to protect their property rights through managing registered information. Thus, a second expected focus of owners' efforts is to secure the accuracy of information about owners' rights. For instance, owners will try to ensure that their ownership of a piece of land is properly registered in the local land registry or recorder of deeds. The vitality of this strategy is obvious, but it is not always easy to implement.

Several factors confound the accuracy of information in registries. To begin with, the act of registration is not costless. While presumably most owners in most circumstances will feel that the benefits of registration exceed the costs, it is at least theoretically possible that some owners will feel the investment is not worth it. This concern is particularly acute with respect to some kinds of intellectual property registration. Consider, for instance, the registration of a patent. In order to

133. See Steve Gold, *Cracking GSM*, Network Security, Apr. 2011, at 12, 14 (noting many cellphones are programmed with “device-specific . . . unique codes” which can be used for identification of mobile devices).

134. See Jill Liphart, *How to Prevent Car Theft*, Quote Wizard (June 29, 2015), <http://quotewizard.com/auto-insurance/prevent-car-theft> [<http://perma.cc/XEK5-5MKH>] (“Displaying the designated Vehicle Identification Number (VIN) on as many major parts of a vehicle as possible makes it difficult for thieves to part-out stolen cars.”); see generally VIN Decoder, Research Maniacs, <http://researchmaniacs.com/VIN/VIN-Decoder.html> [<http://perma.cc/D669-YKTZ>] (last visited Nov. 3, 2015) (detailing process of creating VINs).

maximize the chances that a registered patent will be considered valid, the inventor should search prior patents (and other publications) in order to determine the prior art and know what parts of the invention can legitimately be considered novel and patentable.¹³⁵ The need to engage in significant searches prior to registration greatly increases the cost of recording information in the registry; if the patent revenues are not expected to be significant enough, the inventor will not find registration to be cost effective. Copyright registration poses a related but converse challenge. Under the Copyright Act, registration is optional: Owners must register only if they wish to commence an infringement suit; otherwise, they are not legally compelled to register their works.¹³⁶ Consequently, most copyrighted works are not registered and the public has no way of knowing whether a particular work is copyrighted or not. While registration is relatively low in cost, the benefit of registration is extremely low until the owner is ready to commence a lawsuit. Thus, many copyright owners do not find registration to be cost effective.

Second, information about rights is not constant. For instance, while the purchaser of Blackacre may take care to register all the information about her purchase at the time of the transaction, numerous events will occur over time to render the information incomplete. Workers may obtain mechanics' liens. The municipality may acquire a tax lien. The owner may negotiate the creation of binding covenants with neighbors. The owner may marry and bestow a share in the property upon her spouse. Owners may die and leave property as an inheritance to heirs. If owners wish to keep the registrations up to date, they must constantly keep themselves apprised of the information recorded in the registry and supplement or correct it.

Third, even if owners are perfectly vigilant, they may not be able to perfect the information in the registry. Some registries are set up not to accommodate certain information. Land registries may register deeds, for instance, but not inchoate spousal claims based on theories of marital property. They may register liens, but not real covenants. Registries are not selective about their information simply in order to be difficult. It is costly to maintain registries and to verify information. Registries manage these costs by being selective about the information they contain.

Fourth, even where willing owners meet willing registrars, the registries may not succeed in maintaining perfect accuracy of information. Most information about property rights favors some parties at the ex-

135. See, e.g., Long, *Information Costs*, supra note 1, at 499 (noting in order to obtain patent protection inventor must prove, *inter alia*, "how the invention is different from others in the field (the prior art)").

136. See Christopher Sprigman, *Reform(aliz)ing Copyright*, 57 *Stan. L. Rev.* 485, 494 (2004) (pointing out registration is no longer prerequisite for obtaining copyright protection and is required only for "initiation of an infringement action"); see also 17 U.S.C. § 410(c) (2012) (outlining role of "certificate of registration" in copyright infringement suits).

pense of others. If Susan establishes her mechanics' lien over Thomas's Blackacre, she is better off, but Thomas is worse off. This potentially places owners in conflict with other actors, leaving registries in the uncomfortable position of deciding between them.¹³⁷ In some cases, neither Susan nor Thomas possesses perfect knowledge of the facts and law, and even if they do, they may choose not to share that knowledge with the registry. Adjudicating the relative strengths of competing claims will often be costly and beyond the scope of officials managing a registry. Indeed, even without competitors over registry claims, information is not free and not always readily available. The owner may simply not have enough verifiable information about predecessors in title or other vital facts for her claim to warrant registration.

Fifth, and finally, owners may elect not to register their rights for privacy reasons.¹³⁸ Some owners may not want the rest of the world to know of the full extent of their possessions. This explains the presence of so many anonymous bidders in art auctions. In some cases, the preference for privacy (or secrecy) may be a personality trait or an idiosyncratic preference. In other cases, it may be driven by practical concerns. For example, an art collector may refrain from registering her ownership of a famous painting out of fear that doing so may "invite" others to steal it from her.

For all these reasons, even the best registries are imperfect. And not all registries even try to be perfect. The degree to which such registries can succeed will naturally depend on the ability of the managers of the registry to convince owners to participate, as well as the ability to verify information. Enforcement powers can therefore be critical to the success of a registry. Many private registration systems will be of limited utility, as they will lack the ability to cajole or force centralization of information.¹³⁹ Even state registration systems may suffer from such problems.¹⁴⁰ This is one of the reasons title insurance and other legal means of protecting

137. Mechanics' liens are a particularly apt example insofar as they can be registered automatically and do not require court approval. Yet even in those cases where registration is not automatic and requires the administrator of the registry to turn to a court or tribunal for guidance, indirect costs are imposed on the parties in the course of resolving the competing claims.

138. Arguably, issues of privacy are among the disputed items in the bitter controversy about registration of private ownership of firearms.

139. Cf. Kimball Foster, *Certificates of Possessory Title: A Sensible Addition to Minnesota's Successful Torrens System*, 40 *Wm. Mitchell L. Rev.* 112, 113–14 (2013) (chronicling Minnesota's implementation of Torrens public registration system and subsequent gains in public confidence due to enforcement powers wielded and effectively put to use by panoply of judges, examiners, and registrars).

140. See Charles Szypszak, *Public Registries and Private Solutions: An Evolving American Real Estate Conveyance Regime*, 24 *Whittier L. Rev.* 663, 680 (2003) ("The American Torrens system's limitations have resulted in its abandonment in several states, and very infrequent use in others. In those states that enacted registration systems, registration was voluntary, allowing parties to a conveyance to opt for the traditional system.").

against flaws in information systems persist even in the presence of state-provided registries.¹⁴¹

3. *Aligning Information and Asset.* — A third likely aim of owners will be to secure a stable alignment between registered information and legal rights. Physically aligning title information and asset is a simple and intuitive strategy that owners often adopt, though not uniformly with all assets. Perhaps the simplest version of this strategy is the practice of writing one's name in a book or sewing it into a jacket. More sophisticated versions of alignment seek to permanently etch into an asset the identifying features that will also appear in a property registry. For example, vehicle identity numbers for cars may be electronically coded into the engine as well as machine-stamped in several places in the automobile.¹⁴²

Realty has been the realm of many interesting and successful efforts to stably align information and asset. One can divide these efforts into two categories: legal and technological.

The most important legal change that has improved the alignment of information and asset is the Torrens system of land registration. Sir Robert Richard Torrens is generally credited with having created the Torrens system, first adopted in South Australia in 1858.¹⁴³ Prior to the Torrens system, land registries recorded documents attesting to land transfers.¹⁴⁴ For instance, if Alice sold land to Beatrice, the buyer and seller would take the deed to the relevant recordation office, which would thereafter maintain a copy of the deed. Each deed would carry a nonstandardized description of the land covered in the transaction. The Torrens system reverses matters. In the Torrens system, it is the land that is registered, rather than the transaction. The Torrens system is based on

141. *Id.* at 686–92 (mapping benefits of title insurance and suggesting it achieves same results as Torrens system at far lesser cost); see also John L. McCormack, *Torrens and Recording: Land Title Assurance in the Computer Age*, 18 *Wm. Mitchell L. Rev.* 61, 121–23 (1992) (pressing for retention of recording system coupled with title assurance and computerization as means of importing many of perceived benefits of public registration system).

142. See *How OBDII Helps You When Buying a Used Car*, Scantool Garage (May 7, 2012), <http://www.obdautodoctor.com/scantool-garage/how-obdii-helps-you-when-buying-a-used-car/> [<http://perma.cc/2BQ8-63GD>] (noting VIN can be retrieved from engine through on-board diagnostic software); *What You Need to Know About VIN Etching*, Ellis & Salazar Garage & Body Shop (Jan. 15, 2015), <http://www.ellisandsalazar.com/what-you-need-to-know-about-vin-etching/> [<http://perma.cc/K7SK-NS78>] (describing purpose and process of VIN etching).

143. Blair C. Schick & Irving H. Plotkin, *Torrens in the United States: A Legal and Economic History and Analysis of American Land-Registration Systems* 17 (1978); A.G. Lang, *Computerised Land Title and Land Information*, 10 *Monash U. L. Rev.* 196, 197 (1984).

144. See Szypszak, *supra* note 140, at 664–71 (surveying features and risks of “conveyance recording” systems).

a map of area covered by the registry.¹⁴⁵ When one wants to record a sale of land, instead of writing up and recording a deed that describes the asset to be transferred, one records the transfer of a certificate that refers to a plot of land already described in the Torrens map.¹⁴⁶ The transaction is then reported to and certified by the relevant state authorities. Once the transaction is certified, ownership according to the Torrens registration cannot be challenged, though persons wrongly deprived of ownership may have a claim against a dedicated state fund for errors in Torrens registrations.¹⁴⁷

The advantages of the Torrens system are clear when one compares the difficulty of verifying title under the different registry systems. Under the old recordation system, if Beatrice the purchaser wanted to verify that Alice the seller had good title to Blackacre, Beatrice would have to search for deeds in Alice's chain of title. She would hunt for a deed where Alice was the buyer, note the name of the seller, and then hunt for the deed where that seller originally bought the property. Beatrice would search from deed to deed until she had established a chain of title. Beatrice would then follow the chain forward in time, and it would hopefully lead back to Alice.¹⁴⁸ Misfiled deeds,¹⁴⁹ "wild deeds,"¹⁵⁰ and any number of other phenomena might lead Beatrice to conclude that Alice had good title, even though she did not.¹⁵¹ By contrast, under the Torrens system, Beatrice's examination is quick and easy. To transfer Blackacre, Alice would have to hand over to Beatrice a certificate that identifies Blackacre and Alice as Blackacre's owner. Beatrice need merely go to the registry and check that the certificate is genuine—i.e., that Alice really is the registered owner of Blackacre as described in the certificate.¹⁵²

145. Tim Hanstad, *Designing Land Registration Systems for Developing Countries*, 13 *Am. U. Int'l L. Rev.* 647, 651–52 (explaining how maps are integral to systems of land registration).

146. D.H. Van Doren, *Current Legislation, The Torrens System of Land Title Registration*, 17 *Colum. L. Rev.* 354, 355 (1917).

147. McCormack, *supra* note 141, at 81–83 (discussing various indemnification methods provided under Torrens land registration system).

148. For a description of title searches under deed systems, see *id.* at 67–69.

149. See *id.* at 69 (“[R]ecorded, apparently valid transaction[s] may be void or defective.”); see also Barry Goldner, *The Torrens System of Title Registration: A New Proposal for Effective Implementation*, 29 *UCLA L. Rev.* 661, 666–67 (1982) (listing common causes of misfiled deeds).

150. See Emily Bayer-Pacht, *The Computerization of Land Records: How Advances in Recording Systems Affect the Rationale Behind Some Existing Chain of Title Doctrine*, 32 *Cardozo L. Rev.* 337, 346–47 (2010) (describing wild deed doctrine).

151. See Goldner, *supra* note 149, at 667 (discussing difficulty of determining validity of deed solely on basis of examination of record).

152. See William C. Niblack, *Pivotal Points in the Torrens System*, 24 *Yale L.J.* 274, 276 (“The declaration of the indefeasibility of the title as registered, of the conclusiveness of a certificate of title, is absolutely essential to the working of the Torrens system.”).

Thus, with the simple expedient of a central map, the Torrens system tightly aligns asset with information. Under the Torrens system, land parcels are locked into a configuration by a map, while registration information is keyed to the same map.

The Torrens system is even more valuable when combined with a common reform that has generally accompanied Torrens registration systems. As noted earlier, land parcels are commonly circumscribed in one of two systems. In the metes-and-bounds system, land parcels can be irregular in shape, and they are circumscribed by features of the land and measures described in a deed or other document.¹⁵³ The rectangular system, by contrast, describes land by coordinates on a common map.¹⁵⁴ It should immediately be clear that many jurisdictions that adopted a Torrens system of registration also found it advantageous to adopt a rectangular system of parcelization.¹⁵⁵ The same map can serve as the basis of the rectangular parcelization and of the Torrens registration. To be sure, not all regions with rectangular parcels use Torrens registration, and not all Torrens jurisdictions feature rectangular parcels.¹⁵⁶ Nonetheless, because Torrens systems and rectangular systems often go together, Torrens jurisdictions can frequently benefit from both advantageous asset configurations and from the tight alignment between asset and information.

Technology provides new and improved means of aligning land assets with information about title. GPS technology, along with the proliferation of excellent maps available via the Internet, makes it possible for nearly every buyer and seller to verify the precise boundaries of land parcels, even if the parcels are not rectangular. We can predict that as information technology improves, the ability to align the configuration of land parcels and information about property rights will only increase.

C. *Changing Roles*

To this point, we have assumed a fairly benign picture of owner and nonconsensual taker. These roles, however, may be more complicated. There are times when the owner is not interested in protecting formal title, but rather, is interested in possession only. Likewise, there are times when the nonconsensual taker wants to protect the formal title, in order to establish her own title.

153. Stephen V. Estopinal, *A Guide to Understanding Land Surveys* 93–94 (3d ed. 2009).

154. *Id.* at 103–05.

155. Hanstad, *supra* note 145, at 677–78 (explaining how Torrens system facilitates Cadastral maps, which in turn make parcelization easier).

156. *Id.* at 670–71 (pointing out little of Torrens system finds applicability in United States, which prefers land recordation or registration of deeds system). This is despite widespread deployment of the Rectangular Survey method here.

To see this, consider the example of an owner who finds himself in debt and possibly subject to enforcement actions by a creditor. Until he ran into trouble, the owner would have sought good title information in order to protect his ownership interests in assets. However, under threat of repossession, the owner will seek to hide assets from the creditor, and therefore aim to obscure or destroy title information. The creditor's interests, too, are unlike those of the usual nonconsensual taker. She seeks to use legal proceedings to acquire assets to repay the debt. The closer the debtor moves to insolvency, the greater the creditor's interest in protecting formal title and information about that title. It is this dynamic that drives much of the law of bankruptcy. This dynamic leads, in its extremes, to a reversal of roles. The owner seeks to destroy the interface between title information and asset, while the potential non-consensual taker seeks to preserve it.

Insolvency is not the only circumstance in which this inversion of the usual incentives can occur. Taxes, for instance, can place the state tax collector in the role of nonconsensual taker who seeks good title information, with the owner, again, seeking to obscure that information.

III. WHEN THE STATE COMES MARCHING IN

Until now we have paid little attention to the distinct role of the state as a regulator. In this Part, we introduce the role of the state and examine how the state affects the strategies of the various players in the game of information about property rights.

A. *The Two Roles of the State*

We begin with the obvious: The state takes sides in the battle between owners and nonconsensual takers. The state generally aims not only to raise the value of property rights, but also to ensure that the value of such rights is enjoyed by the legal owners rather than nonconsensual takers.¹⁵⁷ This means that, in general, the state seeks to complement the strategies owners take to defend the security of their rights. However, the power of the state regarding registries is so great that it can help and harm owners at the same time. To see this, return to our earlier observation that registries add value to property rights by *facilitating* transfers among owners and voluntary takers, and by *obstructing* illicit deprivations of title by involuntary takers. The state's actions create countervailing effects. By enhancing the power of registries, for instance, the state may increase their facilitative value while reducing their obstructive value.

157. The state, of course, may have ulterior motives in its management of registries or title information. The state may collect title information in order to make it easier to collect taxes related to the asset or transactions in the asset. Alternatively, or additionally, the state may gather and disseminate title information in order to serve other regulatory goals. These motives are certainly important for a full analysis of registries, though they are beyond the scope of our analysis.

This surprising observation about the state's powers stems from the fact that property disputes must be resolved on the basis of imperfect information. Often, multiple claimants to an asset can point to evidence indicating they have ownership. For instance, Jack may claim ownership of Blackacre on the basis of proven possession for many years, while Jill claims ownership on the basis of a deed of sale from a known previous owner. When the state resolves such cases by vindicating the ownership claim of one of the claimants, it necessarily effaces the competing ownership claim of the other claimant. Any rule of evidence chosen by the state facilitates ownership based on some kinds of evidence and therefore necessarily privileges certain kinds of information by allowing it to trump imperfect property claims.

Even without registries, the state can, and often does, use information about certain aspects of property as a route to perfect title and defeat otherwise potentially valid claims of title. Doctrines of adverse possession provide the most outstanding example. Adverse possession grants perfect title to a property claimant who can prove uninterrupted possession for the requisite period of time, notwithstanding the existence of a competing "true" owner with better prior title.¹⁵⁸

Similar doctrines are often associated with registries. For instance, in some states (so-called "race states"), where the owner of Blackacre sells the property to two buyers in succession, the state grants title to Blackacre to the subsequent purchaser, even though the seller had already given up title by the time of the sale, as long as the subsequent buyer is the first to record the sale in the registry.¹⁵⁹

The result is that the state plays two roles when it maintains a property registry. The first and most obvious role of the state is that of "service provider" of information about title. The state provides a single registry service that almost always benefits from economies of scale that lower the cost of centralized registries run by a single provider.

Second, and more importantly, the state determines the legal consequences of registering and failing to register. The state does not need to restrict its role in registration to simply recording information. The state can step beyond a narrow role and assign legal consequence to registration. In race states, for instance, the state functionally adjusts property title to fit the information in the registry.¹⁶⁰ Once complete, the regis-

158. Thomas W. Merrill & Henry E. Smith, *Property: Principles and Policies* 190 (2d ed. 2012) [hereinafter Merrill & Smith, *Principles and Policies*] (describing principle of adverse possession).

159. See *id.* at 921–22 (explaining how race statutes work).

160. See *id.* at 918 (noting state registration results in constructive notice "as a matter of law," which can block good faith purchaser claims by subsequent transferees); Ray E. Sweat, *Race, Race-Notice and Notice Statutes: The American Recording System*, *Prob. & Prop.*, May–June 1989, at 27, 28 (explaining race states allow first recorder to acquire property title).

tration of property rights can divest title from a prior holder and grant title to the newly registered owner.¹⁶¹

In the literature, the two potential functions of the state—recorder of rights, or arbiter of titles—are referred to as recordation and registration, respectively.¹⁶² In a recordation system, a land registry is limited to recording information about who claims to own Blackacre.¹⁶³ In the registration system, the state potentially makes ownership of Blackacre contingent on the information in the registry.¹⁶⁴ A recording scheme might place every deed concerning Blackacre in the registry without determining the legal consequence of those deeds.¹⁶⁵ Even if potential buyers of Blackacre conducted a thorough title search and purchased title insurance, they would still have to face the possibility that a recording error might defeat their title.¹⁶⁶ By contrast, if the state acted as a “true” registrar, its record of title to Blackacre would be definitive.¹⁶⁷ Once a buyer of Blackacre confirmed that the seller was the registered titleholder in the registry, the buyer could be certain of the seller’s ability to transfer title. No private title insurance would be necessary.¹⁶⁸

When the state acts as a registrar and rewrites property rights in accordance with the information in registries, it lowers the cost of voluntary transactions by reducing the need to search for information. Yet, at

161. Merrill & Smith, *Principles and Policies*, supra note 158, at 918; Sweat, supra note 160, at 28 (observing race states will protect title of subsequent purchaser who is first to record even where subsequent purchaser is aware of earlier conveyance).

162. See, e.g., Benito Arruñada & Nuno Garoupa, *The Choice of Titling System in Land*, 48 *J.L. & Econ.* 709, 710–12 (2005) (drawing distinction between recordation and registration systems); Hanstad, supra note 145, at 670–71, 673–74 (same); Lueck & Miceli, supra note 50, at 214–17 (A. Mitchell Polinsky & Steven Shavell eds., 2007) (same).

163. See McCormack, supra note 141, at 68 (“[T]he acceptance of an instrument for recordation does not usually reflect a governmental judgment that the instrument is legally effective [because] the government is merely a depository of copies of the instruments . . .”).

164. *Id.* at 80 (pointing out statement of ownership contained in certificate is intended to function as “mirror” of true state of title).

165. See Goldner, supra note 149, at 667 (observing with respect to recording systems “validity of a deed cannot be determined from a review of the record”); Hanstad, supra note 145, at 670–71 (“The conventional recording system makes no averments . . . about the state of the title to any parcel of land.”).

166. See Goldner, supra note 149, at 666–67 (describing “several ways in which a cloud of uncertainty hangs over a recorded title”).

167. Hanstad, supra note 145, at 673 (“Under land title registration, a certificate of title . . . provides conclusive evidence of the land rights pertaining to a particular land parcel.”).

168. Goldner, supra note 149, at 669–70 (“Adopting a title registration system would necessarily involve a major cutback, if not the complete dismantling, of the title assurance industry.”). An important feature of U.S. versions of the Torrens system is that they have offered alternative state insurance of the validity of titles certified through the Torrens registration procedure. This state insurance has been costly and highly controversial. See Powell, supra note 73, at 72–73 (surveying exhaustion of various state assurance funds used to satisfy title-error claims).

the same time, the definitive nature of a registry may make theft easier in some cases. If Clarice can successfully counterfeit the information in the registry to record herself as the “owner,” she can acquire a transferable title to the property. In this sense, the registry inadvertently facilitates theft and lowers the barrier to nonconsensual taking.

B. *The Optimal State Registry*

The dual-edged nature of the state’s power allows us to show that the state’s optimal approach can be boiled down to three simple rules.

First, states should view registries as most valuable when there is a tight alignment between the description of the assets in a registry and their actual configuration in the real world. If the state can confidently predict that that alignment will be maintained—as is the case for instance in famous and valuable works of art—then registries have the greatest facilitative and obstructive value.¹⁶⁹ By contrast, if the good in question is difficult to fix in form and description—for instance, if it is a nondescript crate of widgets—there is little point in a registry.¹⁷⁰

Second, registries should only be empowered to rewrite property rights when it is clear that the gains from clearing away potential competing invalid claims outweigh the losses entailed in eliminating potential valid claims. The balance between these gains and losses depends upon the reliability of the information that can be expected in the registry. Reliable information facilitates transactions by the owner; less reliable information may aid transactions of thieves and other takers. In other words, the possibility of inaccurate information may lead to a situation where the facilitative function of registries can clash with the obstructive function. Even with imperfect information, the guarantees offered by “true” registries will still assist owners in transacting and thereby produce facilitative gains for society. However, if thieves can manipulate registries with false information, the registry might work to “launder” takings and grant good title to the successors of involuntary takers. Consequently, the registry can produce a negative obstructive effect; it might actually help rather than hinder thieves. The desirability of having legal rights conform to the registry, therefore, depends on a variety of factors, such as the cost of independently verifying information, the credibility of information in the registry, the vulnerability of the registry to information favoring nonvoluntary takers, and the size of the market for the asset without the registry.

169. Professor Shavell describes registries as most useful when assets are durable and valuable. Shavell, *supra* note 9, at 49–50.

170. Professors Jackson and Baird make the same point about grain in a silo. See Baird & Jackson, *Uncertainty and Transfer*, *supra* note 57, at 306–07 (“[A] title-based recording system is much harder to organize for grain in a silo . . . [because] [o]ne has no easy way of knowing that this was the grain grown on Blackacre in one jurisdiction . . . [or that] . . . the grain in the silo today was the grain that was there yesterday.”).

Third, in considering what information to include in the registry—or, indeed, whether to maintain a registry at all—the state must take into account not only start-up costs, but also the tradeoff between comprehensiveness and accuracy. A registration system that only updates records when it receives evidence ensuring a high degree of accuracy can guarantee that the information located within the registry can be relied upon. At the same time, this demand for accuracy comes with a cost. Evidence is not costless, and the more evidence the state registry demands, the more owners must invest in proving their ownership. These costs will inevitably drive some properties out of the registration system. Owners will examine the cost of producing the necessary evidence and weigh it against the benefits produced by registration, and they may find that registration is simply not worth it. In some cases, moreover, registration may not even be available, as the owner simply lacks the ability to provide the evidence required by the registry. Conversely, a registry that relaxes evidentiary standards can encourage more registrations. With lower costs of obtaining evidence, owners will find it more worthwhile to register property rights. However, the lower evidentiary standards will almost certainly lead to lower quality records. Poorer information will lead to less reliable registries.

We now explain our reasoning behind each of these conclusions.

1. *Aligning Title Information and Asset.* — As we noted in Part II, information about title to property is subject to a constant tug-of-war between owners and potential involuntary takers. Takers have a variety of methods for trying to hide the true title information about assets. Jewelry can be disassembled and precious metals melted; cars can be “chopped” and sold for parts. Land, on the other hand, is much more difficult to mask and reconfigure. Takers will focus their efforts on assets that are vulnerable in their alignment between description and actual physical configuration. The assets that are most amenable to registries are those whose alignment is stable. If the state cannot be certain of the stability of assets and information about them, a registry can be counterproductive.

One important implication is that assets cannot be treated uniformly when it comes to registries. As Professor Shavell notes, in some cases assets will simply not be valuable enough to warrant the cost of registries.¹⁷¹ But for highly unstable assets, our analysis shows that it will be difficult to maintain a viable registry even though title information might potentially be extremely valuable. This is easiest to see in the context of intellectual property. Given the nature of intellectual property, it is often difficult or impossible for owners to effectively imprint indicia of their ownership on their assets. This undermines the ability of registries to tie title information effectively to assets. The problem of online piracy is so intractable precisely because it is difficult to mark assets in the digital

171. Shavell, *supra* note 9, at 50 (listing “radios, televisions, and similar items” as assets not warranting registration).

realm. Two distinct, yet connected, phenomena combine to produce this result. The first, and oft-discussed, is the ease with which new digital copies can be produced.¹⁷² The second, which arises from our analysis, is the inability of rightholders to mark their assets in a stable manner, impervious to manipulation.

In the online realm, copyright notices can easily be removed or effaced. Similarly, information about the owner may be deleted or altered.¹⁷³ Once all ownership-relevant information is removed, nonconsensual users can forge ahead and reproduce the work without any tell-tale signs, giving unsuspecting third parties the impression that the work is “unowned.” It is noteworthy that the actions taken by nonconsensual takers simultaneously benefit the takers and undermine the ability of copyright owners to transact with willing third parties. In this highly compromised informational environment, willing transactors must bear two costs as well. First, they often do not know the identity of the rightful rightholder. Second, they must bear high verification costs even in those cases where the correct information appears, as there is always a risk that information that appears on digital files is incorrect. It is therefore not surprising that not only is online piracy rampant, vulnerable industries have suffered measurable losses.

The state may attempt to combat instability with auxiliary legal protections. Once again, copyright provides an interesting example. One of the provisions of the controversial Digital Millennium Copyright Act of 1998 was an effort to protect the integrity of copyright management information (CMI).¹⁷⁴ Under the act, CMI is information conveyed in connection with copies or displays of copyrighted works concerning the

172. See, e.g., James Boyle, *Cruel, Mean, or Lavish? Economic Analysis, Price Discrimination and Digital Intellectual Property*, 53 *Vand. L. Rev.* 2007, 2013 (2000) (describing information dissemination as “efficient” because “marginal cost of information is zero”); Timothy J. Brennan, *Copyright, Property, and the Right to Deny*, 68 *Chi.-Kent L. Rev.* 675, 698 (1993) (noting “zero marginal cost associated with additional users” of information); Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 *Tex. L. Rev.* 1031, 1053–54 (2005) (suggesting marginal cost in information industry is “zero or close to it”); Neil Weinstock Netanel, *Copyright and a Democratic Civil Society*, 106 *Yale L.J.* 283, 292 (1996) (“[A]s a general rule, once a work is produced, the marginal cost of disseminating it to the public, whether in hard copy or electronically, approaches zero.”); Henry E. Smith, *Institutions and Indirectness in Intellectual Property*, 157 *U. Pa. L. Rev.* 2083, 2116 (2009) (observing marginal cost of additional user of information is zero); Christopher S. Yoo, *Copyright and Public Good Economics: A Misunderstood Relation*, 155 *U. Pa. L. Rev.* 635, 645–46 (2007) (“Once the fixed costs needed to create the first copy of a particular work have been incurred, any number of copies of the original can be made without reducing the supply available for additional copies.”).

173. Russell W. Jacobs, *Copyright Fraud in the Internet Age: Copyright Management Information for Non-Digital Works Under the Digital Millennium Copyright Act*, 13 *Colum. Sci. & Tech. L. Rev.* 97, 146–47 (2011) (describing legal reforms amidst concerns of preserving authentic author attribution of digital works).

174. 17 U.S.C. § 1202 (2012).

copyright ownership and other relevant data regarding rights.¹⁷⁵ The act forbids potential infringers from falsifying, altering, or destroying CMI in certain conditions.¹⁷⁶ The aim of the provision is to create a stable alignment between title information and intellectual property assets, by deterring takers from attempting to destabilize the connection.¹⁷⁷

Finally, the state must provide special rules for situations when parties' incentives are expected to change. It may have to provide special protections for the validity of title information when the owner is insolvent or expected to be insolvent. As we noted previously in section II.C,¹⁷⁸ this is one of the central concerns of the laws of bankruptcy. Richard Epstein also notes the importance of registries in allowing creditors to give notice of their interests to third parties by registering security interests.¹⁷⁹ While Epstein accurately describes the registry as protecting the interests of strangers, it might more accurately be described as protecting the interest of the creditor (here with the incentives of the owner) in preserving the integrity of information against the interest of the owner (here with the incentives of the nonconsensual taker) in undermining the integrity of that information.

2. *Facilitating vs. Obstructing Transactions.* — If and when the state decides to adopt a registry for a certain class of properties, it must confront the question of what legal effect to give to the registries. For some classes of property, the registry should be given the power to rewrite legal rights; it should be a “true” determinative registry that sweeps away inconsistent claims. But for other classes of property, collecting and presenting the information should suffice. Traditionally, the debate about whether true registration is superior to recording has focused on the cost of true registries.¹⁸⁰ We argue that the efficacy of registration depends in

175. Id. § 1202(c)(3).

176. Id. § 1202(a)–(b).

177. It is vital to bear in mind that current intellectual property registries contain information about title to the intellectual property, rather than to any particular physical embodiment of it. For instance, a copyright registry will note that J.K. Rowling owns rights to the copyright in the Harry Potter novels, but it will not register ownership of each of the millions of printed copies of those books. The registry thus provides significantly less shelter value for any given purchaser.

178. See *supra* section II.C (assessing incentives of debtors in bankruptcy context).

179. See Richard A. Epstein, Comment, Notice and Freedom of Contract in the Law of Servitudes, 55 S. Cal. L. Rev. 1353, 1355–57 (1981) (“[W]here recordation of an interest is properly filed, it binds all subsequent takers [because] [a]ctual notice typically is provided by, and properly may be inferred from, proper recordation.”). Epstein’s primary concern is servitudes and the rights of parties with lesser property interests than title, rather than security interests and creditors. However, the analysis is similar.

180. Compare Powell, *supra* note 73, at 40–53 (presenting comparison of costs of land transactions with and without title registration), with McDougal & Brabner-Smith, *supra* note 77, at 1138–43 (impugning on multiple grounds Powell’s comparison of relative costs of registration and title insurance). See generally Arruñada, Property as Economic Concept, *supra* note 44, at 121–25 (presenting expanded cost analysis of land transactions and arguing for necessity of registry system).

larger part on the anticipated facilitative and obstructive effects of the registry.

As demonstrated earlier in Part I,¹⁸¹ registries can increase the value of property rights not only by facilitating lawful transactions, but also by obstructing illicit transactions. If registries do little more than transmit information, these two effects will always go hand in hand. As it is easier for owners to transact, it will be more difficult for involuntary takers to transact. However, when registries do more than merely convey information—when they are “true” registries that sweep away claims that compete with the registered ownership—they can produce facilitating and obstructive effects that work at cross-purposes. This is because “true” registries make it easier for buyers to rely on the registered state of title, no matter whether that registered information is the result of a voluntary and lawful transaction or if it resulted from an involuntary taking coupled with a registry error. If an involuntary taker manages to fool the registry into registering his title as good, a buyer may rely on his title over that of a competing owner who acquired title lawfully but failed to register her interest properly. When takers can benefit from registries as well, registries can facilitate rather than obstruct illicit transactions.

Obviously, the reliability and security of the information obtained by the state is a central factor in identifying cases where the state’s giving determinative power to registries can be counterproductive. If the state can easily verify the verity of title information, it can reduce the likelihood of potential buyers being hoodwinked by involuntary takers. At the same time, the facilitative power of determinative registries is greatest when private buyers in the marketplace have a difficult time themselves verifying title information. Thus, the state should choose to grant determinative power to registries when it has a clear advantage over private actors in verifying information.¹⁸²

3. *Comprehensiveness vs. Accuracy.* — A final factor for the state to consider, when it adopts a registry of whatever type, is what rules the state must adopt specifying the kinds of information the registry will record and present.

Consider a land sale. Should the registry present information about sales that are in process, or should it record only completed transactions? At what stage of payment or delivery of deed should the registry present a land sale as complete and subject to registration? Should registries present information about mortgages or liens? To what degree should the registry demand proof of lack of encumbrances before recording a transfer? Should, for instance, all the neighbors be required to certify a lack of potential nuisance claims before a land transfer can be recorded?

181. See *supra* Part I (setting forth functions of property registries).

182. This same basic tradeoff appears in other contexts as well, such as the question of the rights a bona fide purchaser ought to acquire to goods purchased in the market with defective title.

Each of these procedural questions demands separate analysis, but the central set of concerns presented by each is the same. Greater informational demands by the registry ensure better and more verifiable information, and, hence, a registry that better facilitates voluntary transactions and foils involuntary ones. At the same time, greater informational demands increase the cost of using the registry, and thus threaten to drive transactions partially or completely outside the registry system. At the extreme, a registry can have such demanding rules that it never errs in providing information, but has almost no registered properties because almost no owners can comply with the informational demands.

An example can help illustrate the tradeoff. Consider a state with a Torrens system of land registration with fairly demanding procedural rules for demonstrating that a transaction has taken place. On the one hand, this can create a high degree of confidence in land sales that involve the sale of fully registered rights. On the other hand, the system will create a registry that under-records many transactions which do not meet its demanding procedures. The result will be numerous transactions that are genuine, but which lack and may never acquire the necessary prerequisites for registration.

The right balance between accuracy and comprehensiveness is difficult to specify in the abstract. A high degree of accuracy may compensate for the lack of comprehensiveness. In addition, transacting parties can protect themselves by recording title information through other means. For instance, land sales might be recorded by private entities pending “official” recordation in the land registry.¹⁸³ While such alternative recordations lack the determinative power of the official registry, they would help transacting parties verify much of the title information that is lacking in the official registry.

CONCLUSION

Information is a crucial aspect of any property system. The information contained in registries can dramatically enhance the value of property rights in our society. Furthermore, registries often constitute the most effective way to protect the rights of owners. Notwithstanding their importance, registries are rarely discussed by property theorists. In this Essay, we have sought to illuminate the dual role registries play in the property world. Like the Roman god Janus, registries have two faces. They simultaneously perform a facilitative role by streamlining transactions between willing sellers and buyers, and an obstructive role by hindering nonconsensual deprivations of assets. As this Essay shows, both

183. Robert E. Dordan, Comment, Mortgage Electronic Registration Systems (MERS), Its Recent Legal Battles, and the Chance for a Peaceful Existence, 12 *Loy. J. Pub. Int. L.* 177, 177-80 (2010) (discussing nuances of similar privatized system, MERS, in field of recordation of mortgages, and possible reforms to improve its notice functionality).

effects should be taken into account by policymakers, who must ensure that registries are optimally designed to perform both roles.

This Essay also demonstrates, contra conventional wisdom, that perfect information about assets may be welfare diminishing, as it may prompt nonconsensual takers to destroy, dismember, and reconfigure assets in order to make them unrecognizable and thereby drive a wedge between the description of the asset in the registry and its state in the real world. More generally, we have shown that the main goal of registries should *not* be to offer perfect information about assets and rights, but rather to ensure a stable fit between the information in the registry and the relevant asset covered.

This important insight enables the rethinking of the conditions under which registries would function optimally. In addressing this question, prior scholarship focused exclusively on the cost of collecting and updating the data and the benefits from the registry. Our analysis shows that this view only captures the tip of the iceberg. It fails to take account of the effect of registries on the primary behavior of property owners and third parties and the various strategies they will adopt in the presence of right registries. Applying these insights, this Essay lists the assets and rights for which registries will function well and delineates the limits of registries.

In a sense, registries are the dark matter of the property universe. Their existence is vital to our understanding of the property system, but we know precious little about them. In this Essay, we have sought to shed light on the phenomenon of registries in order to advance our understanding of the operation of property systems and, in particular, the informational environment that optimizes the workings of property law.