REGISTRIES

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ABSTRACT

Registries are perhaps the most crucial and under-theorized dimension of property law. Discussions of registries are relegated to the inner-most pages of property textbooks and they rarely attract the attention of property scholars. Yet, registries make or break property rights. They are the formative forces that shape the world of property. They can dramatically enhance or erode the value of property rights; in some cases they create rights that would not have existed without them. Furthermore, as we demonstrate in this Article, registries and the information contained therein constantly reshape the configuration of assets. In this Article, we offer the first in-depth analysis of the intricate relationship 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 rule by hindering non-consensual encroachments and takings of assets. In addition, they perform an enabling function 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 on 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 non-consensual takers in an attempt to make the asset unrecognizable, as exemplified by millions of stolen cars and jewelry, or, conversely, to attempts to engage in "identity theft" in order to give thieves 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 non-transformable 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 theoretical reasons, but also for practical ones. For example, it can inform policymakers in deciding whether to establish new registries for smart-phones and personal computers in order to combat theft of such devices. Similarly, our analysis sounds a cautionary note as to 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.

INTRODUCTION

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

To date, writing on the property/information interface has primarily focused on three questions. 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 law.[1] Secondarily, in the context of standard property law, scholars – most notably Thomas Merrill and Henry Smith,[2] as well as Clarisa Long[3] – 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.[4]

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

[1] Christopher S. Yoo, *Beyond Coase: Emerging Technologies and Property Theory*, 160 U. PA. L. REV. 2189 (2012); Tun-Jen Chiang & Lawrence B. Solum, *The Interpretation-Construction Distinction in Patent Law*, 123 YALE L.J. 530 (2013); David S. Abrams & R. Polk Wagner, *Poisoning the Next Apple? The America Invents Act and Individual Inventors*, 65 STAN. L. REV. 517 (2013); Amy Kapczynski & Talha Syed, *The Continuum of Excludability and the Limits of Patents*, 122 YALE L.J. 1900 (2013); Jonathan Masur, *Patent Inflation*, 121 YALE L.J. 470 (2011); Jeremy N. Sheff, *Marks, Morals, and Markets*, 65 STAN. L. REV. 761 (2013); Xiyin Tang, *Note – The Artist as Brand: Toward a Trademark Conception of Moral Rights*, 122 YALE L.J. 218 (2012); Shyamkrishna Balganesh, *Copyright Infringement Markets*, 113 COLUM. L. REV. 2277 (2013); Gideon Parchomovsky & Alex Stein, *Intellectual Property Defenses*, 113 COLUM. L. REV. 1483 (2013); Dotan Oliar, *The Copyright-Innovation Tradeoff: Property Rules, Liability Rules, and Intentional Infliction of Harm*, 64 STAN. L. REV. 951 (2012).

[2] Thomas W. Merrill & Henry E. Smith, *The Property/Contract Interface*, 101 COLUM. L. REV. 773, 795-96, 801-02 (2001); 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); Henry E. Smith, *Property and Property Rules*, 79 N.Y.U. L. REV. 1719, 1753-54 (2004).

[3] Clarisa Long, *Information Costs in Patent and Copyright*, 90 VA. L. REV. 465, 480 (2004); Clarisa Long, *Patent Signals*, 69 U. CHI. L. REV. 625, 668–71 (2002).

[4] Thomas J. Miceli & C.F.Sirmans, *An Economic Theory of Adverse Possession*, 15 INT'L REV. L. & ECON. 161, 164 (1995); William C. Marra, *Adverse Possession, Takings, and the State*, 89 U. DET. MERCY L. REV. 1, 14-15 (2011). The author argues that the removal of rent-seeking, by compelling the record owner to come forward, disclose information and stake her claim within the statute of limitations, is one of the more powerful justifications for adverse possession.

value of the ownership 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 or 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 had no knowledge of their property rights. Knowledge of title to the assets in this case was worth hundreds of billions of dollars.[5] More recently, the British network BBC has broadcast a program entitled "Heir Hunters," in which probate detectives attempt to locate owners who are unaware that they have inherited assets and money.[6]

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 non-consensual takings of the assets. Indeed, this is the reason for the rise of registries for rights in movable goods, such as cars and boats. To give a recent example, many universities have established title registries in bicycles to battle the epidemic of bicycle theft on campuses.[7] This policy is predicated on the belief that information about assets constitutes as important a deterrent against theft as locks, chains and security cameras.

In short, the informational environment in which property rights

[5] 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 Litigation, 105 F.Supp.2d 139 (E.D.N.Y. 2000) and http://www.swissbankclaims.com/Overview.aspx.

[6] *See* http://www.bbc.co.uk/programmes/b007nms5.

[7] *See infra*, Part I.C.

exist can diminish or enhance the value that accrues to owners from assets. This key observation implies that property theorists can no longer confine their scholarly inquiries to the design of property law, but must instead adopt a much broader gaze that takes full account of the informational universe in which property rights resides.

This Article is the first attempt to illuminate the informational aspect of title to property. We make four contributions to understanding the interplay between property and information. First, we analyze the "obstructive function" 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,[8] we demonstrate that information about property rights performs three 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, non-consensual 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 benefit 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 health of an asset. It is tempting to believe that society would be best off with an informational regime that offers perfect information about title to property rights in assets, since such a regime would offer the highest possible degree of protection against non-consensual conversions of property. Unfortunately, this intuition is misplaced. As we show, when they cannot tamper with the informational environment such as the content of property registries, non-consensual takers may resort to altering physically or even destroying others' assets. Their illicit activities may include disassembling automobiles, machinery, and electronic goods, and transforming jewelry into scrap metals.[9] Alternatively, where property information is collected in a particular location as part of a centralized registry, but the information is vulnerable, non-

[8] STEVEN SHAVELL, FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW 46-52 (2004).
[9] *See infra*, Part II.A.

consensual 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 "identity," the thief is able to take possession of all the assets registered in the owner's name. [10]

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

Third, we uncover 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), non-consensual takers and the government all constantly struggle over the asset-information 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.[11]

Drawing on our previous work, we define the assets for which it is socially desirable to set up and maintain registries of information about title in property rights.[12] Our analysis shows that despite the high value of registries, for many categories of assets it does not make sense to establish registries. Here, too, our analysis departs from prior theorizing. 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 and the asset as it exists in the real world. 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

[10] *Id.*
[11] *Infra,* Part II.B.
[12] *Infra,* Part III.

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.

Additionally, it will rarely make sense 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.

We posit that no theory of property can be complete without paying close heed to the informational dimension of property rights and the registries that record information about titles. To fill this gap, this Article begins a vital discussion about the interplay of property with the information about property and how to increase the value of both.

Structurally, the Article proceeds in three parts. In Part I, we explore the conventional justification for registries as it appears in the legal and economic literature. The conventional justification, we will show, is predicated on what we consider a narrow and static view of information about assets and property rights, emphasizing the role of information about property as a mechanism for reducing transaction costs between voluntary buyers and sellers. We supplement the conventional justification by showing how registries affect value for non-consensual takers of property as well. In Part II, we propose a dynamic view of the function of registries. Adding non-consensual takers to the analysis yields a much richer game-theoretic perspective on registries and brings into light the multiple strategies taken by property owners and non-consensual takers in their interactions. We show that these strategies constantly reshape the world of property holdings, leading the world of property chattels to constantly vacillate between periods of relative security of possession and volatility of possession, depending on the relative success of the strategies adopted by the parties. In Part III, we introduce the government into the analysis. We analyze the ways by which the state can intervene in the market for information about property and thereby change the strategies for private actors. Furthermore, we show that the success of

the government in carrying out this task may both increase and reduce the value of property rights to their rightful holders. 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 convey ownership information.

The main contributors to this latter literature are Thomas Merrill and Henry 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 common, etc.) to those already established by law. 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 won't have to expend excessive efforts on educating themselves about the content and nature of property rights. Accordingly, Merrill and Smith argue, the task of recognizing new rights is entrusted to the state alone.[13] Elaborating on the same theme, Henry 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 its doctrinal design communicates information to third parties.[14]

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

[13] Thomas W. Merrill & Henry E. Smith, *Optimal Standardization In The Law Of Property: The Numerus Clausus Principle*, 110 YALE L.J. 1 (2000). *But cf.* Abraham Bell & Gideon Parchomovsky, *Of Property and Federalism*, 115 YALE L. J. 72 (2005).

[14] Smith, *supra* note 2; Henry E. Smith, *Exclusion And Property Rules In The Law Of Nuisance*, 90 VA. L. REV. 965 (2004); Henry E. Smith, *Property as the Law of Things*, 125 HARV. L. REV. 1691 (2012); 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).

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. 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 assets, where the true owners were unaware of their ownership interests in the assets. 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 of assets 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.[15] 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, a single 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.

[15] *See* Shavell, *supra* note 8 at 47-48.

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.[16]

In this Part, we explore the function of property registries in facilitating licit transactions and obstructing illicit transactions. We began 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 1930's, but recent years have seen few contributions.

The main contributors to the economic literature include Hernando de Soto, Dean Lueck, Gary Libecap and Bennito Arruñada.[17] 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.

For example, in his seminal work on informal property rights in Latin America,[18] Hernando de Soto discusses *de facto* property rights,

[16] Thomas W. Merrill, *Property and the Right to Exclude*, 77 NEB. L. REV. 730 (1998). The author argues that the right to exclude others is more than just one of the most essential constituents of property, and is its very sine qua non.

[17] We discuss Steven Shavell's important contributions separately in Part I.B, *infra*.

[18] HERNANDO DE SOTO, THE MYSTERY OF CAPITAL: WHY CAPITALISM TRIUMPHS IN THE WEST AND FAILS EVERYWHERE ELSE (2000).

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.[19] Addressing the welfare loss resulting from the existence of such de facto rights, de Soto points to the importance of formal state recognition of property rights. De Soto argues that the absence of state recognition and registration of the property rights greatly diminishes their value (and therefore further impoverishes the squatters). For example, 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. Because the informal property lacks the panoply of protections that comes with state recognition, they cannot be mortgaged, pledged or levied upon.[20] De Soto's proposed solution is a massive titling effort that would bring those rights into the formal property system.[21] De Soto's proposal pays relatively little attention to the legal details of such an effort.

In legal parlance, de Soto's work concentrates on the issue of titling.[22] That is, de Soto is primarily interested in the state assigning legal title. Our Article, 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 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, de Soto's work conflates the questions, treating the process of titling as necessarily entailing recording as well.[23]

Another representative example of the economic literature can be

[19] *Id.* at 56. *Cf.* Abraham Bell & Gideon Parchomovsky, *Property Lost in Translation*, 80 U. CHI. L. REV. 515, 570-72 (2013).
[20] DE SOTO, *supra* note 18, at 56.
[21] *Id.* at 39-40, 45-46, 49-51.
[22] *See* Bernadette Atuahene, *Land Titling: A Mode of Privatization with the Potential to Deepen Democracy*, 50 ST. LOUIS U. L.J. 761 (2006) (defining "land titling" as a phenomenon where governments give individuals ownership to the land they occupy).
[23] 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 non-consensual possessors can be used both to update defective registrations, and also to reallocate title to presumably better owners. A project that records titles of squatters — one of the central themes of de Soto's work — thus simultaneously reallocates title and registers it.

found in a series of recent articles by Gary Libecap and Dean Lueck.[24] The articles stem from a large empirical study of land demarcation.[25] Libecap and Lueck examine patterns of demarcation—essentially, the division of land in individual lots. In particular, they compare two demarcation systems that predominate in the U.S.: the rectangular system and the metes and bounds system. Under the metes and bounds system that is common to 15 states, the boundaries of land parcels are marked by reference to landmarks or topographic features. For example, a parcel may be recorded as extending from the river bed 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. 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.[26] Libecap and Lueck's main finding is that the rectangular system is generally associated with higher land values.[27]

While 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—i.e., how the land was physically divided into smaller parcels—Libecap and Lueck's analysis contains only a veiled reference to land registries. In listing the advantages of the rectangular system, 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. 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, promoting land markets."[28] Like de Soto, 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

[24] *See* Gary D. Libecap & Dean Lueck, *The Demarcation of Land and the Role of Coordinating Property Institutions*, 119 J. POL. ECON. 426 (2011).
[25] *See id.* at 436-59.
[26] *Id.* at 427-28.
[27] *Id.* at 428-29.
[28] Gary D. Libecap & Dean Lueck, *The Demarcation of Land and the Role of Coordinating Institutions* 1, 14 (Nat'l Bureau of Econ. Research, Working Paper No. 14942, 2009), *available at* http://ssrn.com/abstract=1401787.

implications of the difference between registration and recordation.[29] 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 utilizing[30] and departing[31] 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 resource.[32] 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.[33] In other words, the initial allocation must satisfy certain informational minima necessary for the operation of markets.[34] The gist of this thread in the literature is captured by the two following propositions: (a) information about entitlements lowers transaction costs; (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 Bennito Arruñada is a case in point. Arruñada, arguably the most prolific

[29] We discuss the differences between recordation and registration in Part III.A, *infra*.

[30] Benito Arruñada, *Property as an Economic Concept: Reconciling Legal and Economic Conceptions of Property Rights in a Coasean Framework*, 59 INT. REV. ECON. 121 (2012); YORAM BARZEL, ECONOMIC ANALYSIS OF PROPERTY RIGHTS 11 (2d ed. 1997).

[31] Thomas W. Merrill & Henry E. Smith, *What Happened to Property in Law and Economics*, 111 YALE L.J. 357 (2001).

[32] BARZEL, *supra* note 30, at 51-53; Merrill & Smith, *supra* note 30, at 374.

[33] Arruñada, *supra* note 30, at 121-122.

[34] This observation was offered by Ronald Coase himself. *See* R. H. Coase, *The Problem of Social Cost*, 3 J. Law & Econ. 1, 16 (1960) (observing that "the initial delimitation of legal rights does have an effect on the efficiency with which the economic system operates."). As Arruñada critically writes, this literature adopts "a simplistic view of Coase (1960), to see 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, *supra* note 30, at 132.

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"[35] and, in particular for ignoring the *in rem* nature of property rights and for failing to distinguish them from contractual, *in personam*, rights.[36] In his work, 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."[37] Furthermore, the main problem on which 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."[38] 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."[39]

The same transactional concerns animate Arruñada's other research in this area. For example, in another paper, 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 transactions. Registries, by providing accessible and accurate information about rights in assets, lower search costs for acquirers, and thereby obviate the need for the services of lawyers, public notaries and licensed conveyers.[40]

Surprisingly, a review of the legal literature reveals a paucity of recent theoretical articles on registration and communication of

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[35] Dean Lueck & Thomas J. Miceli, *Property Law*, *in* 1 HANDBOOK OF LAW AND ECONOMICS 183, 187 (A. Mitchell Polinsky & Steven Shavell eds., 2007) *quoted in* Arruñada, *supra* note 30, at 132.

[36] Arruñada, *supra* note 30, at 132.

[37] Benito Arruñada, *Property titling and conveyancing*, *in* RESEARCH HANDBOOK ON THE ECONOMICS OF PROPERTY LAW 237, 238 (Kenneth Ayotte & Henry E. Smith eds., 2011).

[38] *Id*.

[39] *Id*.

[40] Benito Arruñada, *Market and Institutional Determinants in the Regulation of Conveyancers*, 23 EUR. J. LAW & ECON. 93, 102-08 (2007).

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 Robert Jackson.[41] 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.[42] Transfer of property rights without transfer of possession was considered a fraudulent transaction, null and void under the law. The emergence of registration dramatically transformed the field of property law. Registration, 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*. The existence of a central registry, by publicizing property entitlements, affords owners a much greater degree of freedom with respect to right transfers.[43] 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.[44] The more general point, however, is that registration adds value to owners by allowing them to engage in transfers of rights that they couldn't execute otherwise. This phenomenon is what we dub the *facilitating effect* of information about property.

On this basis, Baird and Jackson introduce their core thesis. They note the existence of a bi-directional 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.[45] However, since there is a cost to setting up and maintaining registries, it may not be beneficial to establish registries in all cases.[46] Hence, Baird and Jackson's main goal is to specify the conditions under which registries are socially desirable.

Unfortunately, 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

[41] Douglas G. Baird & Thomas H. Jackson, *Information, Uncertainty, and the Transfer of Property*, 13 J. LEGAL STUD. 299 (1984).
[42] *Id.* at 302-03.
[43] *Id.* at 305-06.
[44] *Id.* at 307-08.
[45] *Id.* at 301.
[46] *Id.* at 305.

cost-effective when the rights in the underlying asset are subject to frequent transfers.[47] The authors speculate that a high rate of transfers necessitates frequent updating of the registry and the cost of doing so may outweigh the benefits.[48] Baird and Jackson also note that registries don't 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.[49] More generally, it can be said that high demarcation and identification costs may outweigh benefits of registries' information-forcing effects. Finally, Baird and Jackson posit that registries for personal property would be of limited use when they are geographically 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.[50] This problem does not arise with respect to real estate.[51]

The literature that is closest to our concerns is one that has seen few contributions in the last seventy years. A 1938 study of registration systems by Richard Powell[52] prompted a series of articles arguing against Powell's conclusions. 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 Article.[53] 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,

[47] *Id.* at 304, 306.
[48] *Id.* at 306. Here, we feel obliged to remind our reader that 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) ("The 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. According to this view, for example, Glidden's invention of barbed wire in 1874 should have stimulated more subdivision of rangeland in the American West. And this indeed appears to have occurred.").
[49] *Id.* at 306-07. Technology also lowers demarcation costs. *See* Abraham Bell & Gideon Parchomovsky, *A Theory of Property*, 90 CORNELL L. REV. 531, 565 (2005).
[50] Baird & Jackson, *supra* note 41, at 310 ("Automobiles, by contrast, which are not subject to a federal system, create problems when they are moved from one jurisdiction to another…").
[51] *Id.* at 310 ("Real property, by definition, never moves.").
[52] RICHARD R. POWELL, REGISTRATION OF TITLE TO LAND IN THE STATE OF NEW YORK (1938).
[53] *See, infra*, Part II.B.3.

but at far greater expense. Powell thus argued against adoption of a Torrens system of land registration. Critics claimed that Powell misread the data, and that Torrens land registry systems provided clear advantages to the public.[54] Powell's approach won the day. Torrens land registry systems are not widely used in the United States today.[55]

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 in the United States in a series of articles.[56] In one article Miceli and Sirmans provided an economic model to explain what they saw as the advantage of the Torrens system.[57] 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. In another article co-authored with Henry Munneke and Geoffrey Turnbull, 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.[58] Joseph Janczyk similarly argued in favor of the Torrens system in an article claiming that the Torrens system would lower the costs of transactions enough to justify costs of adopting a new Torrens registration system.[59]

We revisit the topic of Torrens registration later in our Article.[60]

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[54] *E.g.*, Walter Fairchild and 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 (1938-1939); Myres S. McDougal and John W. Brabner-Smith, *Land Title Transfer: A Regression*, 48 YALE L.J. 1125 (1939).

[55] For an overview of the historic debates, as well as the U.S. experience with different registration systems, *see* BLAIR C. SHICK AND IRVING H. PLOTKIN, TORRENS IN THE UNITED STATES: A LEGAL AND ECONOMIC HISTORY AND ANALYSIS OF AMERICAN LAND REGISTRATION SYSTEMS (1978).

[56] *See, e.g.*, Matthew Baker, Thomas J. Miceli, C.F. Sirmans and Geoffrey K. Turnbull, *Optimal Title Search*, 31 J. LEGAL STUD. 139 (2002).

[57] Thomas J. Miceli and C.F. Sirmans, *The Economics of Land Transfer and Title Insurance*, 10 J. REAL ESTATE FIN. & ECON. 81 (1995).

[58] Thomas Miceli, Henry J. Munneke, C.F. Sirmans and Geoffrey K. Turnbull, *Title Systems and Land Values*, 45 J. L. & ECON. 565-582 (2002).

[59] Joseph Janczyk, *An Economic Analysis of the Land Title Systems for Transferring Real Property*, 6 J. LEGAL STUD. 213 (1977).

[60] *See, infra*, Part II.B.3, and Part III.B.

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 between selling owners and voluntary buyers. In the remainder of this Part, we focus on the importance of a second and third function 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 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,[61] this means that buyers enjoy greater security in their acquisitions, and, they will therefore, presumably, pay more for the rights they acquire. This makes an owners' 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

[61] *Infra*, Section I.A.

"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 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 Baird and Jackson note, this is a good historical description of the world prior to registries.[62] 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.[63] 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 non-voluntary 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

[62] Baird & Jackson, *supra* note 41, at 303.

[63] Douglas G. Baird & Thomas H. Jackson, *Possession and Ownership: An Examination of the Scope of Article 9*, 35 STAN. L. REV. 175, 180 (1983).

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 non-consensual 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 at the hands of a thief. A registry allows potential buyers to ascertain the rights in an asset and abstain from transacting with non-registered 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 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 non-consensual takings of movable property. But even, here, they clearly dampen the incentive to engage in non-consensual 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 running the risk of 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. Thus, 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. At the same time, it provides property owners with effective protection against non-consensual 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 of this is provided by Steven Shavell's description of registries in his sweeping FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW.[64] Shavell describes "discouraging theft" as one of the two principal virtues of registration systems,[65] and he notes that the presence of a property registry reduces the ability of the thief both to use and to transfer the property. However, Shavell adds a curious note of skepticism, arguing that individual owners are unlikely to consider the value of deterring thieves in considering whether to register ownership in a particular asset, given that the marginal deterrence for a single registration is quite small.[66]

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 non-consensual 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 Holocaust[67] – provide outstanding examples of the enabling function of property registries. At the same time, such examples illustrate the difficulty registries have in enabling owners' use of their assets.

[64] Shavell, *supra* note 8 at 47.
[65] *Id*.
[66] *Id.* at 48.
[67] *See supra*, note 5, and accompanying text.

Simply put, registries are not self-executing. Registries in the modern world do not provide information to interest 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,[68] 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 information is 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. 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.

Hernando de Soto's empirical work on formalization of legal rights in property may provide a crude measure of the added value registration create for land owners. De Soto famously estimated that in Peru alone there is a loss of $74 billion in what he calls "dead capital."[69] 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

[68] *See supra*, note 6, and accompanying text.

[69] DE SOTO, *supra* note 4, at 33 n.148 ("The value of extralegally held rural and urban real estate in Peru amounts to some $74 billion."). De Soto's figures have been disputed**.** Christopher Woodruff, *Review of de Soto's The Mystery of Capital*, 39 J. Econ. Lit. 1215, 1220–22 (2001) (book review); 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); 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)).

are distinct. It may very well be the case that in the cases studied by de Soto most of the benefit would accrue to owners from formalization, irrespectively of registration. Hence, one cannot cleanly translate de Soto's studies into proof of the value of registration.

Additionally, subsequent empirical research has called into question some of 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 over-estimated[70] 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. It is not surprising that economists[71] and the World Bank[72] have emphasized the need for empirical work on the long term effects of registries.

The need for empirical work is particularly striking when it comes to obstructive effects. There has been no theoretician with the stature of 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 report a reduction in boat theft incidents as well as an impressively high recovery thanks to the establishment of a registry for boats in the hope of dashing 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."[73] Impressively, the recovery rate

[70] 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).

[71] *See, e.g.,* Grenville Barnes, *A Comparative Evaluation Framework for Cadastre-Based Land Information Systems (CLIS) in Developing Countries* 1-186 (Land Tenure Center, Research Paper No. 102, 1990), *available at* http://minds.wisconsin.edu/handle/1793/34180.

[72] *See generally* World Bank, Report on Land Policy and Administration: Lessons Learned and New Challenges for the Bank's Development Agenda (2001).

[73] *Owners can Reduce Boat Theft with Basic Steps*, LANECOUNTY.ORG, http://lanecounty.org/Departments/Sheriff/PoliceServices/Pages/stolenboats.aspx

in Lane County is roughly a third, which is twice or three times higher than the national recovery rate that stands at 10%-15%.[74]

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 20% 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. The perceived success of the registry has prompted calls to force cellphone providers in the U.S. where cellphone related crime has gone up in recent years to adopt a similar measure.[75]

But the most detailed data on what we termed as 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. In the early 1990s, the number of thefts skyrocketed to 100,000 per year and stolen bicycles were resold for 5%-10% of the original price. After the establishment of the registry, the annual number of stolen bikes in Norway has been reduced from 100,000 in 1995 to 60,000 in 2004. The bicycle thefts reported to the police have been reduced from 26,577 to 19,141. The thefts reported to the insurance industry have been reduced from 18,100 to 9,468, and their losses have been reduced from NOK 70.8 million (roughly US$12 million) to NOK 34.0 million (less than $6 million).[76]

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

(last visited October 15, 2013).

[74] *Id.*

[75] Rolfe Winkler, *Carriers Band to Fight Cellphone Theft*, THE WALL STREET JOURNAL (Apr. 9, 2012, 10:52 PM), http://online.wsj.com/article/SB10001424052702303815404577334152199453024.html.

[76] *Bicycle Theft in Norway*, SYKKELTYVERI.NO, http://www.sykkeltyveri.no/bicycle_theft.html (last modified May 28, 2005, 09:13 AM).

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 non-consensual 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 non-consensual 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 non-consensual 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. On the surface, one would expect that owners want registries with lots of accurate data, and thieves want registries with as little data as possible. Surprisingly, we will 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 asset protected by property rights. This is because both owner and thief 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 identity number, and every boat has an identity number built into its frame in non-removable 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 by thieves. In such cases, owners realize little or no obstructive value from registries, and registries provide little or no additional stability in ownership.

Conversely, if information and the 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 non-consensual takers to upset 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 underlying 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.

A. Strategies of Non-Consensual Takers

For potential thieves, the world consists of many assets to which

the thief has no legal right, but which 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 joy rides (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 illicit but an important component of the utility of "economic property rights."[77] Thieves can realize some of the utility of assets, and the utility that they can realize must be taken into account.[78]

Of course, this is not something we view in a positive light.[79] Naturally, society does not aim, and should not aim to aid thieves.[80] 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.[81] 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 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 joy-rides 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.

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[77] BARZEL, *supra* note 30, at 141; Yoram Barzel, *The Capture of Wealth by Monopolists and the Protection of Property Rights*, 14 INT'L REV. L. & ECON. 393, 394 (1994).

[78] BARZEL, *supra* note 30, at 3, 141-42.

[79] Abraham Bell & Gideon Parchomovsky, *A Theory of Property*, 90 CORNELL L. REV. 531, 571 (2005).

[80] *Id.* at 571-72.

[81] *Cf.* Eduardo Moisés Peñalver & Sonia K. Katyal, *Property Outlaws*, 155 U. PA. L. REV. 1095 (2007) (arguing that property outlaws have enabled the reevaluation of the distribution or content of property entitlements and that the law should therefore be careful not to over-deter nonviolent refusals to abide by existing property arrangements.).

Registries

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, non-consensual takers employ three strategies to compromise the value of registries to owners. The first is to reconfigure the assets themselves in order to create gaps 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.[82] At first blush, the case for a cellphone registry appears indisputable. Smart phones 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 the smartphone theft as long as thieves can turn a profit from taking the devices apart and selling the electronic components individually. Indeed, a comprehensive registration system would drive non-consensual 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

[82] Such a registry was recently launched in Canada. *See* Ellen Roseman, *New Registry Lets You Spot Stolen Phones*, TORONTO STAR (Oct. 1, 2013), available at http://www.thestar.com/business/tech_news/2013/10/01/new_registry_lets_you_spot_stolen_phones_roseman.html. In the U.S., private companies considered adopting a similar solution. *See Thefts of Cell Phones Rise Rapidly Nationwide*, USA TODAY (Oct. 20, 2012), available at http://www.usatoday.com/story/tech/2012/10/20/thefts-of-cell-phones-rise-rapidly-nationwide/1646767/.

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 non-takers to the establishment of a registry.

The second strategy employed by non-consensual 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.[83]

The third strategy, and the most difficult for non-consensual takers to employ, is to leave the asset, and the registry information about the asset intact, but to attempt to utilize the information in the registry to take control of ownership. In one version, non-consensual takers may attempt to rewrite entries in the registry to show that they are the true owners. For instance, bank robbers, these days, may try electronic theft. Instead of physically entering a bank and demanding cash, the thieves may seek to hack into the data register 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 emission allowances and reassign the rights to make it appear that they lawfully possessed allowances.[84]

In a different version of this strategy, instead of hacking the registry to change information about the owners, the non-consensual takers attempt to masquerade as the owners. The popular and dangerous fraud known as "identity theft" involves non-consensual takers appropriating enough personal information about an individual victim to allow themselves to convince keepers of registries, such as

[83] Edward R. Kleemans, *Organized Crime, Transit Crime, and Racketeering*, 35 CRIME & JUST. 163, 191-92 (2007) (explaining the *modus operandi* of mafia organizations involved in the illicit activity of trafficking in stolen cars).

[84] Nathanial 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.

banks and credit card companies that the takers are actually the individual in question. The identity thieves then use the false identities to obtain assets registered in the name of the victims.[85]

Before concluding our analysis of non-consensual taker's strategies, we should note that none of these strategies is cost-free, and costs will alter the choices of non-consensual takers.

We begin with the cost structure of non-consensual takers' illicit activity. No matter what the non-consensual takers do to improve their chances of successful appropriation, they will have to invest some time, effort or expense. Defacing 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 non-consensually because the theft is no longer cost-effective, or because similar items may be stolen at less cost. But in other cases, non-consensual takers may still find theft worthwhile, notwithstanding the cost. Just as significantly for our purposes, the costs may be uneven, pushing non-consensual takers to 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 registry, they can make their control of an asset look legitimate, and thereby enjoy the benefits of

[85] *See* http://www.justice.gov/criminal/fraud/websites/idtheft.html.

registry's facilitating function.

B. Strategies of Owners

Owners are not left without recourse when faced with the threat of strategic behavior by potential non-consensual 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 thieves'. 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.[86] 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 counter-intuitive strategy for configuring assets: damaging their own goods or acquiring lower quality goods *ab initio*. In his classical

[86] *Supra* Part II.A.

article, *The Rhino's Horn: Incomplete Property Rights and the Optimal Value of an Asset,*"[87] Professor Douglas Allen compiles examples of cases in which this strategy may be employed.

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 at all. They hunt the rhinos down for one reason only: the rhinos' 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. 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. Allen and others suggest that black rhino could be saved if its horn were to be surgically removed by environmental organizations. The rhinos can easily survive without their horn—indeed, it is of very little use to them—but in the sad reality that emerged in Africa, the rhino cannot survive with it.[88]

This observation led 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.[89] Two examples illustrate this possibility. The first is the removal of stereo systems in cars, or, in some cases, the installation of inferior quality stereos. Owners find this damage to their own utility worthwhile where 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 not to fall prey to the predation of bicycle thieves. In this case, too, the owner voluntarily agrees to give up a certain level of enjoyment to get greater security of possession in exchange.

The rationale behind the owner's actions in both cases—the car

[87] Douglas W. Allen, *The Rhino's Horn: Incomplete Property Rights and the Optimal Value of an Asset*, 31 J. LEGAL STUD. S339 (2002).
[88] *Id*. at S348-50.
[89] *Id*. at S347-48.

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.[90] Vehicle identification numbers (VINs) are placed in automobiles in multiple locations in order to ensure that the numbers cannot be easily removed.[91] 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, 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

[90] Steve Gold, *Tracking GSM*, NETWORK SECURITY, Apr. 2011, at 12, 12.

[91] *How to Prevent Car Theft*, QUOTE WIZARD (Feb. 4, 2014), http://quotewizard.com/auto-insurance/prevent-car-theft; *VIN Decoder*, RESEARCH MANIACS (Feb. 4, 2014), http://researchmaniacs.com/VIN/VIN-Decoder.html.

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 appraised of the information recorded in the registry, and supplement or correct it.

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.

Third, even where willing owners meet willing registries, they may not succeed in maintaining perfect accuracy of information. Most information about property rights favors some parties at the expense of others. If Susan establishes her mechanics' lien over Thomas' 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. In some cases, neither Susan nor Thomas possess 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.

Fourth, and finally, owners may elect not to register their rights for privacy reasons.[92] Some owners may not want to 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. At others, 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

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

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. Even state registration systems may suffer from such problems. This is one of the reasons title insurance and other legal means of protecting against flaws in information systems persist even in the presence of state-provided registries.

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.

Realty has been the realm of many interesting and successful efforts to stably align information and asset. We can, without too much overgeneralization, 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. Prior to the Torrens system, land registries recorded documents attesting to land transfers. 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 non-standardized 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 a map of area covered by the registry. 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 plot of land already described in the Torrens map.[93] The transaction is then reported to the relevant state authorities, who certify it. 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.

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.[94] Misfiled deeds,[95] "wild deeds"[96] and any of a number of other phenomena might lead Beatrice to conclude that Alice had good title, even though she did not.[97] 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.

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.

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[93] D.H. Van Doren, *Current Legislation – The Torrens System of Land Title Registration*, 17 COLUM L. REV 354, 355 (1917).

[94] For a description of title searches under deed systems, *see* John L. McCormack, *Torrens And Recording: Land Title Assurance In The Computer Age*, 18 WM. MITCHELL L. REV. 61, 67-69 (1992).

[95] *Id.* at 69; Barry Goldner, *The Torrens System Of Title Registration: A New Proposal For Effective Implementation*, 29 UCLA L. REV. 661, 666-67 (1982).

[96] 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); John L. McCormack, *supra* note 94, at 69.

[97] Barry Goldner, *supra* note 95, at 667.

Registries

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.[98] The rectangular system, by contrast, describes land by coordinates on a common map.[99] 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.[100] 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.[101] 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, make 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.

III. WHEN THE STATE COMES MARCHING IN

Until now we have paid little attention to the distinct role of the state. 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.

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[98] STEPHEN V. ESTOPINAL, A GUIDE TO UNDERSTANDING LAND SURVEYS 93-94 (3d ed., 2009).
[99] *Id.* at 103-105.
[100] Tim Hanstad, *Designing Land Registration Systems For Developing Countries* 13 AM. U. INTL L. REV. 649, 677-78 (explaining how the Torrens system facilitates Cadastral maps, which in turn makes parcelization easier).
[101] *Id.* at 670-71 (pointing out that little of the Torrens system finds applicability in the United States, which prefers a land recordation or registration of deeds system). This is despite widespread deployment of the Rectangular Survey method here.

Registries

A. The Two Roles of the State

We begin with the obvious: the state takes sides in the battle between owners and takers. The state generally aims not only to raise the value of property rights, but to ensure that the value of such rights is enjoyed by the legal owners rather than non-consensual takers.[102] 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.

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 defeats the competing ownership claim of the other claimant. Any rule of evidence chosen by the states facilitates ownership based on some kinds of evidence necessarily allowing certain kinds of information 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,[103]

[102] 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.

[103] THOMAS W. MERRILL & HENRY E. SMITH, PROPERTY: PRINCIPLES AND POLICIES 190 (2d ed. 2012).

notwithstanding the existence of a competing "true" owner with better prior title.

Similar doctrines are often associated with registries. For instance, in many 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.[104]

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 the 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.[105] Once complete, the registration of property rights can divest title from a prior holder and grant title to the newly registered owner.[106]

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.[107] In a recordation system, a land registry suffices with recording information about who claims to own Blackacre. In the registration system, the state potentially makes ownership of Blackacre contingent on the information in the registry. A recording scheme might place every deed concerning Blackacre in the registry without determining the legal consequence of those deeds.[108] Even if potential buyers of Blackacre conducted a thorough

[104] *Id.* at 921-22.
[105] Id. at 918; Ray E. Sweat, Race, Race-Notice And Notice Statutes: The American Recording System, PROB. & PROP., May-June 1989, at 27, 28.
[106] THOMAS W. MERRILL & HENRY E. SMITH, *supra* note 103, at 918; Ray E. Sweat, *supra* note 105, at 28.
[107] *E.g.*,Benito Arruñada and Nuno Garoupa, *The Choice of Titling System in Land*, 48 J. L. & ECON. 709 (2005); Dean Lueck and Thomas J. Miceli, *Property Rights and Property Law* § 5.1.1., in I HANDBOOK OF LAW AND ECONOMICS 214-217 (A. Mitchell Polinsky and Steven Shavell, eds., 2007); Hanstad, *supra* note 100, at 670-71, 673-74.
[108] *Id.* at 670-71; Barry Goldner, *supra* note 95, at 667.

title search and purchased title insurance, they would still have to face the possibility that a recording error might defeat their title.[109] By contrast, if the state acted as a "true" registrar, its record of title to Blackacre would be definitive.[110] Once a buyer of Blackacre confirmed that the seller was the registered title-holder in the registry, the buyer could be certain of the seller's ability to transfer title. No private title insurance would be necessary.[111]

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 the same time, the definitive nature of 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 non-consensual 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.[112] 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.[113]

Second, registries should only be empowered to rewrite property

[109] Goldner, *supra* note 95, at 666-67.
[110] Hanstad, *supra* note 100, at 673.
[111] Goldner, *supra* note 75, 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 52.
[112] Shavell describes registries as most useful when assets are durable and valuable. *See* Shavell, *supra* note 8, at 49-50.
[113] Jackson and Baird make the same point about a grain in a silo. *See* Baird & Jackson, *supra* note 41, at 306-07.

rights when it is clear that the gains in 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.[114] Thus the registry can produce a negative obstructive effect; it might actually help rather than hinder thieves. Thus, the desirability of having legal rights conform to the registry will depend 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 non-voluntary takers, and the size of the market for the asset without the registry.

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 demanded by the state registry, 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, *supra*, information about title to property is subject to a constant tug-of-war between owner and potential involuntary takers. Takers have a variety of methods for trying to hid 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 Shavell notes, in some cases assets will simply not be valuable enough to warrant the cost of registries.[115] 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 to 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 realm. Two distinct, yet connect, phenomena combine to produce this result. The first, and oft-discussed one, is the ease with which new digital copies can be produced.[116] The second, which arises from our analysis, is the

[115] SHAVELL, *supra* note 8, at 50 ("radios, televisions, and similar items").

[116] Henry E. Smith, *Institutions And Indirectness In Intellectual Property*, 157 U. PA. L. REV. 2083, 2116 (2009); Christopher S. Yoo, *Copyright and Public Good Economics: A Misunderstood Relation*, 155 U. PA. L. REV. 635, 645-46 (2007); James Boyle, *Cruel, Mean, or Lavish? Economic Analysis, Price Discrimination and Digital Intellectual Property*, 53 VAND. L. REV. 2007, 2013 (2000); Timothy J. Brennan, *Copyright, Property, and the Right To Deny*, 68 CHI.-KENT L. REV. 675, 698 (1993); Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1053-54 (2005); Neil Weinstock Netanel, *Copyright and a Democratic Civil Society*, 106 YALE L.J. 283, 292 (1996).

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.[117] Once all ownership relevant information is removed, non-consensual users can forge ahead and reproduce the work without any telltale signs, giving non-suspecting third parties the impression that the work is "unowned." It is noteworthy that the actions taken by non-consensual 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 Millenium Copyright Act of 1998 was an effort protect the integrity of copyright management information (CMI).[118] Under the act, CMI is information conveyed in connection with copies or displays of copyrighted works concerning the copyright ownership and other relevant data regarding rights.[119] The act forbids potential infringers from falsifying, altering or destroying CMI in certain conditions.[120] 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.[121]

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[117] 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, 148 (2012).

[118] 17 U.S.C.A. § 1202 (1999).

[119] 17 U.S.C.A. § 1202(c)(3) (1999).

[120] 17 U.S.C.A. § 1202(a),(b) (1999).

[121] 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.

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, the state should suffice with collecting and presenting the information. Traditionally, the debate about whether true registration is superior to recording has focused on the cost of true registries.[122] We argue that the efficacy of registration depends in larger part on the anticipated facilitative and obstructive effects of the registry.

As we showed *infra*,[123] 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. 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 counter-productive. If the state can easily verify the verity of title information, it can reduce the likelihood of 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

[122] Compare POWELL, *supra* note 52 with McDougal & Brabner-Smith, *supra* note 54. *See generally*, BENITO ARRUÑADA, INSTITUTIONAL FOUNDATIONS OF IMPERSONAL EXCHANGE: THEORY AND POLICY OF CONTRACTUAL REGISTRIES (2012).
[123] Part I, *infra*.

advantage over private actors in verifying information.[124]

3. Comprehensiveness vs. Accuracy

A final factor to be considered by the state, when it adopts a registry of whatever type, is what rules the state must adopt specifying the kinds of information that will be recorded and presented in the registry.

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?

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

[124] 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.

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.[125] 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

Registries are 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 Article, we 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 rule by hindering non-consensual deprivations of assets. As we showed in this Article, both effects must be taken into account by policymakers, who must ensure that registries are optimally designed to perform both roles.

We also demonstrated, contra conventional wisdom, that perfect information about assets may produce adverse effects for property owners and society at large, as it may lead non-consensual takers to destroy, dismembers 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 showed 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 enabled us to rethink the conditions under which registries would function optimally. In addressing this

[125] Robert E. Dordan, *Mortgage Electronic Registration Systems (MERS), Its Recent Legal Battles, And The Chance For A Peaceful Existence*, 12 Loy. J. Pub. Int. L 177 (2010) (discussing the nuances of a similar privatized system, MERS, in the field of recordation of mortgages, and possible reforms to better its notice functionality).

question, prior scholarship focused exclusively on the cost of collecting and updating the data and the benefits from the registry. Our analysis showed 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. Moreover, we listed the assets and rights for which registries will function well and delineated 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 Article, we have sought to shed light on the phenomenon of registries in order to advance our understanding of the operation of property systems.