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THE CHOICE OF TITLING SYSTEM IN LAND*

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ABSTRACT

This paper analyzes the choice of the socially optimal titling system assuming rational individual choices about recording, assurance, and registration decisions. It focuses on the enforcement of property rights to land under private titling and the two existing public titling systems, recording and registration. When the reduction in the expected costs of forfeiture balances the higher cost of initial registration, a registration system is more efficient than a recording system. Implications for title assurance, land improvements, and transactions are also considered.

I. INTRODUCTION

THE functioning of titling systems in land has important consequences for the economy. Investments in land are affected by the security of property rights. Furthermore, land is relatively unmovable, so it provides good collateral. Well-functioning titling systems therefore promote investment and reduce the transaction cost of credit. This was well understood by reformers in the nineteenth century, when the transition from a system of privacy of property rights to one of publicity, of either deeds or rights, was hotly discussed.¹ Knowledge about the design of these systems has again become crucial with the attempts (and repeated failures) to lay out the institutional foundations of markets in developing and transition economies. As an influential writer suggests, developed societies may have forgotten the blueprints of their basic institutions in this field.² This article, in tandem with previous work, aims to explain their structure.³

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¹ For references on these discussions, see Benito Arruñada, Property Enforcement as Organized Consent, 19 J. L. Econ. & Org. 401, 432 n.75 (2003).

² See Hernando De Soto, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* (2000).

³ See Arruñada, *supra* note 1; and Benito Arruñada, A Transaction-Cost View of Title Insurance and Its Role in Different Legal Systems, 27 Geneva Papers Risk & Ins. 582 (2002).

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Legally, “property rights” are rights in rem, enforced by the courts by applying a rule of property.⁴ Rights holders are thus protected against future actions by other people. They are, however, uncertain about the quality of their title, given that it can be defeated if someone with a better title appears.⁵ For instance, an owner is protected against fraudulent conveyance of her land but may lose the land if she bought it from someone who lacked good title and the legal owner claims it.

This article compares how different legal systems solve this problem, reducing the uncertainty of property rights. We use as the benchmark a regime of privacy, under which the courts enforce property rights in rem even if they have remained hidden. To the extent that consent of affected rights holders (legal owners but also mortgagees, neighbors, public authorities, and so on)⁶ is frequently impossible to gather ex ante because of lack of information about hidden conflicting rights, most rights remain subject to substantial uncertainty. They face the risk that a competing property right might emerge, transforming them into contractual rights that are in conflict with the previously hidden rights.

For this reason, modern legal systems enforce as property rights only those for which either titles or rights themselves are made public, giving rise to the two systems that we will call “recording” and “registration.”⁷ Under recording (for example, in France and the United States), courts solve con-

⁴ In the way exposed by Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 Harv. L. Rev. 1089 (1972), which opposes property and liability rules even if not dealing with the in rem nature of property. When rights to land are enforced as property rights, they are claimable against the asset itself and are therefore valid against all persons. They are said to “run with the land,” meaning that they survive unaltered through all kinds of transactions and transformations dealing with other rights on the same or neighboring parcels. For example, the mortgagee keeps the same claim on the land even after the mortgagor sells it. By contrast, contractual rights are enforced only against a specific person. See also a series of works focusing mainly on the constraints that legal systems impose on their creation, the so-called *numerus clausus* problem: Michael Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 Harv. L. Rev. 621 (1998); Michael Heller, *The Boundaries of Private Property*, 108 Yale L. J. 1163 (1999); James Buchanan & Yoon Yong, *Symmetric Tragedies: Commons and Anticommons*, 43 J. Law & Econ. 1 (2000); Thomas Merrill and Henry Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 Yale L. J. 1 (2000); Thomas Merrill & Henry Smith, *The Property/Contract Interface*, 101 Colum. L. Rev. 773 (2001); Thomas Merrill & Henry Smith, *What Happened to Property in Law and Economics?* 111 Yale L. J. 357 (2001); and Henry Hansmann & Reinier Kraakman, *Property, Contract, and Verification: The Numerus Clausus Problem and the Divisibility of Rights*, 31 J. Legal Stud. S373 (2002).

⁵ The term “title” may refer to a legal right, as here, or to the evidence of it, often a deed. Any ambiguity is easily clarified by context.

⁶ From now on, we will use the terms “ownership” and “owner” to refer to the variety of property rights and rights holders in real estate. Current owners are also assumed to be good-faith third-party acquirers. In addition, we will refer to the loss of the in rem standing of a right (caused, for example, by the loss of priority of a mortgage) as “forfeiture” even if, strictly speaking, this term is applicable only to ownership.

⁷ For the sake of simplicity, we abstract from complementary systems, such as adverse possession, prescription, and quiet title suits.

flicts by allocating property rights according to the date when the private contracts, the deeds, are filed in a public office. This encourages parties to record as soon as possible and makes it possible for parties and intermediaries to collect the consent of all affected rights holders, voluntarily reducing titling conflicts. Under registration (including the Torrens version), private contracts also get provisional priority when they are lodged. However, the registrar, acting in a quasi-judicial capacity, registers a right only if no other rights are damaged or consent is given by any rights holders affected. This mandatory requirement of consent removes potential defects and allows the legal system to consider registered rights as conclusive, changing the liability rule for those necessarily rare cases in which an error arises. Therefore, innocent third-party acquirers are fully protected when they rely on the register and keep the land even if a legal owner appears. A comparable process of gathering consent or "purging" rights takes place under recording, made possible by the filing requirement and driven by the voluntary interest of acquirers. However, given the private and voluntary nature of such purging, the courts necessarily continue to apply a property rule for allocating property rights in case of title conflict.

In a series of articles, Thomas Miceli and coauthors model the consequences of using property and liability rules for solving title conflicts.⁸ Generally speaking, these models (in contrast, for example, to other analyses)⁹ do not recognize that registration and recording entail different costs and provide different benefits in terms of lowering the costs of forfeiture and uncertainty. In addition, the finding that registration is efficient is driven by the assumption that the current owner values the land more than the claimant. Finally, they do not consider privacy.

We solve these shortcomings by building a model that is closer to the

⁸ In particular, Thomas Miceli & C. F. Sirmans, *The Economics of Land Transfer and Title Insurance*, 10 *J. Real Estate Fin. & Econ.* 81 (1995), argues that (a) if transaction costs after adjudication are low (most notably, zero transaction costs), both recording and registration are efficient; that is, under both systems, the land ends up with the party who values it most; (b) if transaction costs are high and the current owner values the land more than the claimant does, registration is usually superior because it awards the land to the party who values it most; and (c) both the current and the legal owners prefer the system that awards each of them the land rather than monetary compensation equal to its market value. A related work, Thomas Miceli, C. F. Sirmans, & Geoffrey Turnbull, *Title Assurance and Incentives for Efficient Land Use*, 6 *Eur. J. L. & Econ.* 305 (1998), argues in favor of the superiority of registration because it induces optimal investment in land improvement, whereas under recording, investment is discouraged to the extent that returns on investment will probably be appropriated by the claimant. Furthermore, Thomas Miceli, C. F. Sirmans, & Geoffrey Turnbull, *The Dynamic Effects of Land Title Systems*, 47 *J. Urb. Econ.* 370 (2000), shows that registration is more efficient than recording because the potential for legitimate adverse claims tends to inefficiently hasten land development in recording. In the long run, registration is more efficient because of gains in land improvements, even if the current owner values the parcel of land less than the claimant.

⁹ See Joseph Janczyk, *An Economic Analysis of the Land Systems for Transferring Real Property*, 6 *J. Legal Stud.* 213 (1977).

production functions that experts claim the two systems are able to offer, with registration incurring higher operating costs than pure recording (without assurance) but also providing greater benefits, and considering that owners have always the option of privacy. Moreover, we drop the restrictive assumption that current owners necessarily value land more than claimants. We investigate whether it is more efficient to implement recording or registration taking into account two main problems solved by land titling, enforcing property rights and reducing transaction costs. These more realistic assumptions produce highly relevant results, as we are able to reveal the hidden costs and benefits of each titling system, to predict how their comparative advantage is affected by exogenous changes, and to derive testable implications. In particular, our results suggest that, contrary to previous findings by Miceli and coauthors, the relative efficiency of the different titling systems is unlikely to be resolved on purely theoretical grounds. More important, our model identifies the crucial dimensions for evaluating both systems empirically.

In our model, choosing recording rather than registration could be more efficient because we explicitly consider the possibility of privacy. Registration is more costly; hence, some parcels of land that could be recorded if such a system were introduced will remain in what we call privacy, that is, out of the public system of land titling and not actually registered. In addition, the explicit consideration of titling assurance (title "insurance" in the United States) supports the argument because it is socially efficient to assure highly valuable parcels of land. While registration assures all registered parcels, recording with titling assurance assures only the most valuable parcels of land.

The paper proceeds as follows: in Section II, we discuss the problem of rights enforcement. Extensions of the model (title assurance, land development, and the problem of transaction costs) are considered in Section III. Final remarks conclude the paper (Section IV).

II. THE PROBLEM OF RIGHTS ENFORCEMENT

In this section, we model individual titling decisions and social choice of the optimal land titling system in the presence of uncertainty about the legal quality of titles. We assume that sellers and buyers have the same information about title quality, an assumption that will be dropped in Section III C. We start by considering three classes of titling system for dealing with title claims, leaving the possibility of title assurance until Section III A.

We consider the possibility of keeping property rights private as an alternative to titling systems, both of which make property rights public. We assume that current owners do not necessarily record or register their titles but may instead rely on keeping them private. Their decision will depend on a trade-off of individual costs and benefits. We then model the social

decision to introduce a titling system assuming this individual freedom to record or register.¹⁰ We assume that more costly titling systems reduce expected forfeiture costs more significantly; we also assume a higher incidence of claims under recording than under registration, an assumption that is supported by empirical evidence.

A. *Individual Choice*

In a perfect world, with no uncertainty and no conflicting claims, the value of a parcel of land would be V . This value will be lower in the real world, however. Let θ be the marginal reduction of the private value of land due to expected costs of forfeiture, which is common knowledge for sellers and buyers.¹¹

We consider three different classes of system for land titling. Under privacy, the marginal expected cost of forfeiture is θ_0 , where $0 < \theta_0 < 1$. If the current owner does not record or register the deeds, the expected value of ownership would be $(1 - \theta_0)V$, where the expected cost of forfeiture is θ_0V (see Figure 1).¹²

Under recording, the marginal expected cost of forfeiture is θ_1 , where

¹⁰ This freedom is commonly found in reality except in the few jurisdictions in which registration is required to create or transmit property rights. The extent of this freedom most commonly depends on the willingness of the law or the courts to grant property, in rem, status to unrecorded or unregistered possessory rights, which is often done in a fuzzy way, with the courts imposing strict requirements for a third-party acquirer to be considered in good faith. This fuzziness justifies our assumption about the higher incidence of claims under privacy. For a more detailed analysis of the scope of free choice under these systems, see Arruñada, *supra* note 1, at 428–32. Registration and recording are usually compulsory, however, for abstract rights, such as mortgages, in all jurisdictions.

¹¹ Forfeiture costs include potential loss of the land for its current owner, transaction costs in future transactions, including those incurred to make transactions possible, and opportunity losses from transactions that will not take place owing to the remaining uncertainty, with all costs measured in probabilistic terms (this would therefore include the “demoralization” costs considered the seminal work by Frank Michelman, *Property, Utility, and Fairness: Comments on the Ethical Foundations of “Just Compensation” Law*, 80 Harv. L. Rev. 1214 (1967)). We model these forfeiture costs as a percentage of the value of the land. Implicitly, we therefore assume that forfeiture costs exhibit constant returns to scale; thus, the marginal expected cost of forfeiture is constant within a given titling system. Presumably, higher-valued parcels of land are in fact subject to a higher probability of forfeiture for a given level of title assurance, thus incurring a higher marginal expected cost of forfeiture. Consideration of this characteristic would make the exercise more cumbersome, but there is no reason to think that the results obtained should not replicate those that we suggest.

¹² The marginal expected cost of forfeiture under privacy is assumed to be independent of the titling system chosen by the government. Explicitly considering this dependence in the model would modify the value of social welfare but not the observed fundamental divergence between the private and social motives for recording or registering land. Furthermore, it is unclear in which direction such dependence should go. On the one hand, one might be tempted to argue that privacy benefits from the existing public system, that is, that it free rides on the more effective public system (through a mechanism of general deterrence of claims, for instance). On the other hand, the stronger effects of public titling may be abused to fabricate claims on private titles. For instance, if neighboring land is registered rather than recorded, an owner should check that its boundaries are correctly defined.

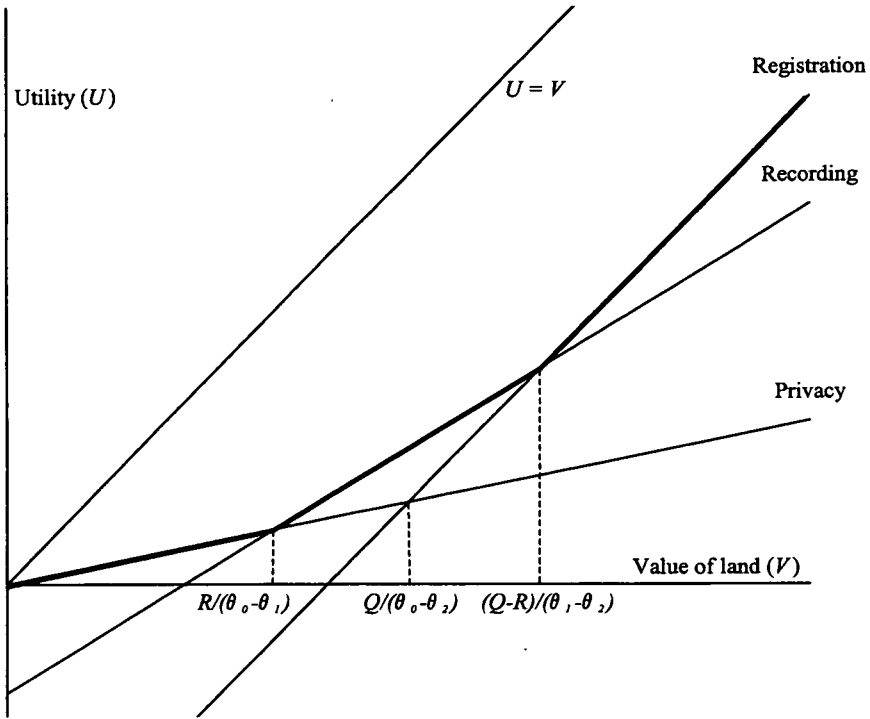


FIGURE 1.—Private utility as a function of the value of land under different titling solutions

$0 < \theta_1 < \theta_0 < 1$, and the expected value of ownership would then be $(1 - \theta_1)V - R$, where R is the private cost of recording, including the explicit price as well as other implicit costs. We assume that the marginal cost of forfeiture is greater under privacy, that is, $\theta_1 < \theta_0$, because recording eliminates some claims that might be possible, in particular, those originated by any subsequent deeds granted by the former grantor. The choice between privacy and recording is determined by comparing the cost of recording, R , with this gain from reducing the marginal expected cost of forfeiture, $(\theta_0 - \theta_1)V$.

Under registration, the marginal expected cost of forfeiture is given by θ_2 , where $0 < \theta_2 < \theta_1 < \theta_0 < 1$. The owner will then get $(1 - \theta_2)V - Q$, where Q is the private cost of registration, including the explicit price as well as other implicit costs. The marginal expected cost of forfeiture in registration is not zero because even if, under registration, owners in good faith do not suffer any forfeiture risk linked to former claims, they still suffer some chance

of losing their property because of a registration mistake in the future.¹³

As Figure 1 shows, if the three options are available, an individual owning land of value V would rely on privacy when the land is not very valuable, would record if its value is within a given interval, and would register if the land is highly valuable.¹⁴ Also note that the difference between the 45-degree line (utility in the perfect world) and the expected utility for the preferred titling system is greater for higher land values.¹⁵ In particular, given that individuals are assumed to be risk neutral, any current owner of land valued at V would prefer privacy if $(\theta_0 - \theta_1)V < R$ and $(\theta_0 - \theta_2)V < Q$, recording if $(\theta_0 - \theta_1)V > R$ and $(\theta_1 - \theta_2)V < Q - R$, and registration otherwise.

B. Social Choice

The enforcement of land claims generates not only private but also social costs when transfers occur from current owners to rightful claimants (in privacy and recording) or from current owners to wrongful owners (in registration). The possibility of these nonconsensual transfers is socially costly because they trigger rent seeking and, generally, transaction costs, especially to make future consensual transactions possible and to protect against fraud.¹⁶ We assume that these social costs are a percentage of the private cost of

¹³ Nevertheless, notice that greater effectiveness of registration in reducing the marginal expected cost of forfeiture is also supported by the consideration that, without a very low probability of forfeiture for legal owners, the use of a liability rule becomes unsustainable. With a substantial number of failures, the application of a liability rule bankrupts the registration system to the extent that it is eventually abolished (as was the case with the Torrens registers in many U.S. jurisdictions).

¹⁴ In Figure 1, it is assumed that $(\theta_0 - \theta_2)R < (\theta_0 - \theta_1)Q$. Otherwise, recording is never preferred.

¹⁵ Owners choose between the available titling options according to the present value of law, which incorporates expectations of future value. Individual titling choices are bound to become outdated as prices move up or down, but in an asymmetric fashion: while owners of revaluated land could easily "title up," owners of depreciated land cannot title down (choosing privacy) and would have therefore invested too much in recording or registering their now depreciated land. Two qualifications are in order. First, this loss would be short-lived because rights holders would return to privacy for future transactions, so their losses would be limited to the costs sunk in one instance of publicity. Second, given the higher cost of registration, the loss would be greater under registration.

¹⁶ For instance, real resources are spent in fabricating frauds and litigating disputes over current ownership. In addition, future land sales become more difficult when titles are unclear. Furthermore, our rationale is applicable to all kinds of property rights, even those in which possession plays no role (as in mortgages), rather than only to ownership. Nor does our model rely on particular assumptions about who indemnifies the losing party (that is, the wrong owner under recording or the legal owner under registration). From a social viewpoint, it is not important because we consider social welfare in a purely utilitarian way (thus, the indemnification to the losing party is cancelled out by the payment made by the winning party). From an individual viewpoint, we can interpret the loss from forfeiture as a loss after indemnification.

forfeiture, λ , such that $0 < \lambda < \infty$.¹⁷

To identify the social optimum, let us suppose that in a given economy, the value of land V is distributed with a probability density function $f(V)$ and a cumulative density function $F(V)$ in the interval $[0, V_{\max}]$, and let us normalize the quantity of land to one. In each titling system, social welfare is given by the social value of the parcels of land that remain under privacy and those whose titles are filed in the available public titling system. This aggregated value is given by the area below the broken lines shown in Figures 2 and 3 for privacy and either recording or registration.

When the government chooses recording, social welfare, W , is given by two integrands representing the social net benefits from privacy and recording, where r is the social cost for recording land:

$$W^{rc} = \int_0^{R/(\theta_0 - \theta_1)} (1 - \theta_0 \lambda) V dF(V) + \int_{R/(\theta_0 - \theta_1)}^{V_{\max}} [(1 - \theta_1 \lambda) V - r] dF(V). \quad (1)$$

Similarly, when the government chooses registration, social welfare is given by two integrands representing the social net benefits from privacy and registration, where $\rho > r$ is the social cost of registering land.¹⁸

$$W^{rg} = \int_0^{Q/(\theta_0 - \theta_2)} (1 - \theta_0 \lambda) V dF(V) + \int_{Q/(\theta_0 - \theta_2)}^{V_{\max}} [(1 - \theta_2 \lambda) V - \rho] dF(V). \quad (2)$$

¹⁷ In general, we would expect that $\lambda < 1$ since individuals will typically bear a higher expected private cost than the expected social cost (among other reasons, because a transfer of land benefits other individuals in the economy). However, for technical completeness, we allow for the possibility that $\lambda \geq 1$, so the possibility that forfeiture might generate substantial rent seeking is considered. Also notice that our rationale is algebraically equivalent to, but does not rely on, the assumption made in Miceli, Sirmans, & Turnbull, Title Assurance, *supra* note 8, whereby current owners value land more than claimants. In other words, both rationales are formally similar, but ours is grounded on costs instead of preferences. More important, in *id.*, this assumption is critical for deriving the result that a registration system is more efficient than a recording system. In our model, when λ equals zero, the socially optimal titling system is privacy since both recording and registration generate costs and no benefit. Later on, when land improvements are considered, as in Section III B, that is no longer true. When λ is zero, privacy is not necessarily superior because the incentives for land improvement are diminished.

¹⁸ The variable cost of each system is explicitly included, assuming that the marginal cost of registration is higher than that of recording. This is consistent with the assumed probabilities of forfeiture under the two systems. In choosing this set of assumptions, our purpose is to model the essential features of the different titling technologies (that is, their different costs and effectiveness in reducing title uncertainty). Assumptions about costs and effectiveness are, of course, open to criticism. We have endeavored to introduce in the model the parametric differences that we think are generally accepted in the literature. The scant empirical evidence available also supports the idea that registration results in higher costs but reduces the probability of forfeiture more than recording does. See Janczyk, *supra* note 9; Blair C. Shick & Irving H. Plotkin, *Torrens in the United States: A Legal and Economic Analysis of American Land Registration Systems* (1978); Thomas J. Miceli *et al.*, *Title Systems and Land Values*, 45 *J. Law & Econ.* 565 (2002). Nevertheless, we must recognize that we assume that the costs of recording or registration do not vary with land value and that the prices charged for both kinds

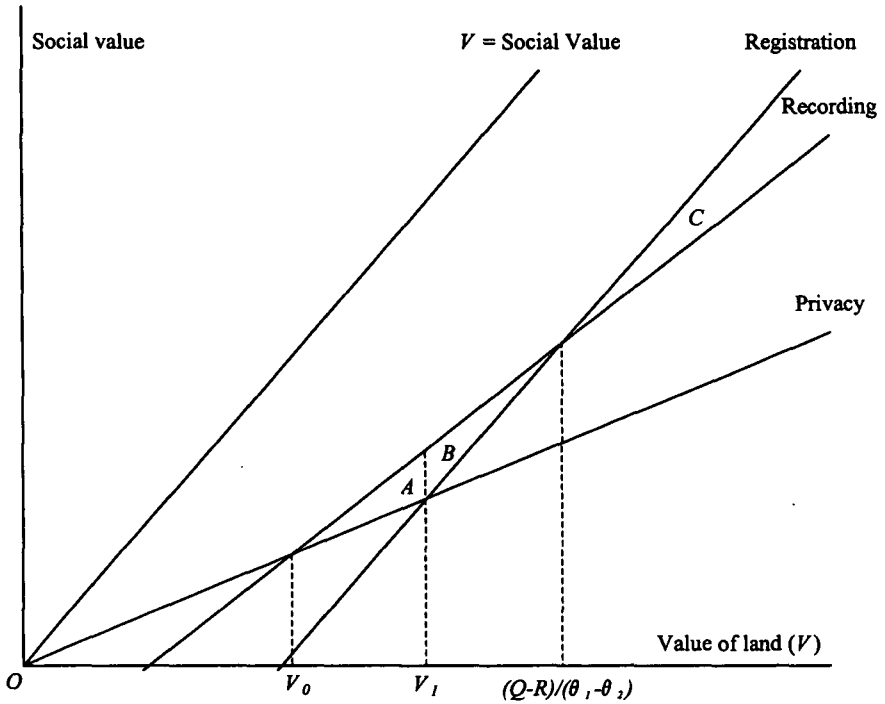


FIGURE 2.—Social welfare as a function of the value of land under different titling solutions when $V_1 > V_0$.

Social welfare is maximized when the prices of recording and registration equal their social costs, that is, $R = r/\lambda$ and $Q = \rho/\lambda$. Given that the social cost of registering land, ρ , is greater than the social cost of recording, r , that is, $\rho > r$, the price for registration should be higher than the price for recording.¹⁹

of service also remain constant with land value. However, the results should not be affected by this assumption because, were we to allow costs to vary with land value, prices would also vary with land value. In this case, we should look for the appropriate two-tier tariff (which is usually applied in practice) instead of the fixed prices. Finally, there are no fixed costs related to the (first-time) creation of registration or recording offices. Only variable costs are considered. Creating a registration system is surely more costly than creating a recording system, but this cost difference lies mainly in greater variable costs at the time of initial registration, not in the fixed costs of starting up the system. When title assurance is added to recording, it may even incur larger fixed costs than registration owing to the duplication of title plants, as explained by Arruñada, *supra* note 3.

¹⁹ Notice, however, that if we had taken the view that registration and recording differ not only in the marginal expected cost of forfeiture, θ , but also in the social cost incurred, λ , this conclusion would not necessarily hold because of, for example, the stricter *numerus clausus* required by registration. Also, in Section III B, where we consider land improvements, a different result would be obtained since registration generates more capital improvements and thus is socially more beneficial.

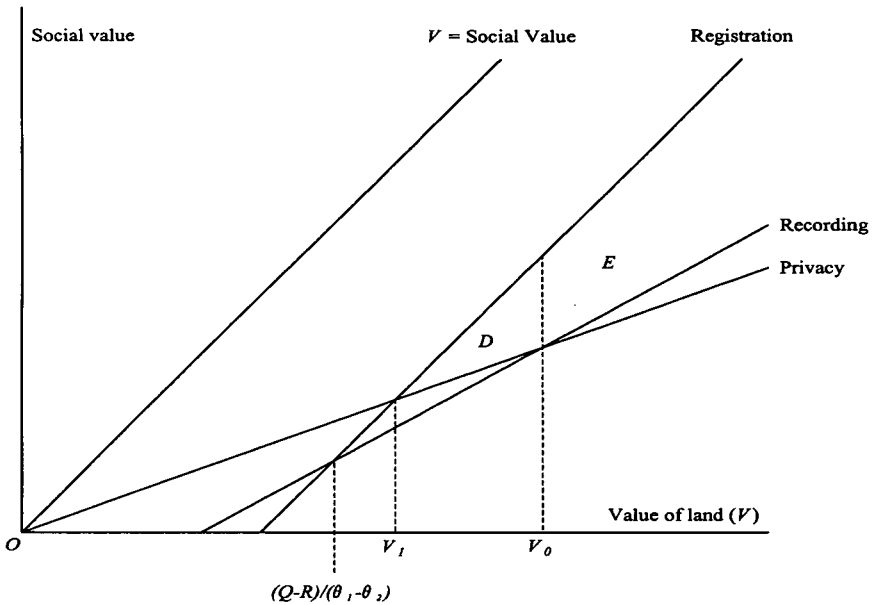


FIGURE 3.—Social welfare as a function of the value of land under different titling solutions when $V_0 > V_1$.

More important, in both recording and registration, prices should be higher than individual marginal costs as long as social costs are positive but lower than individual costs (that is, $0 < \lambda < 1$) because current owners do not take into account that if a claim takes place, the social loss is less than the private loss.²⁰ Thus, owners will file titles that, from a social standpoint, would better remain private.

The choice between recording and registration should be based on comparing W^{rc} and W^{rg} . Because privacy is a viable alternative, whatever the titling system, adopting recording or registration not only places land in one or the other titling system, potentially causing over- and underassurance (the second term in both expressions, W^{rc} and W^{rg}), but also leads owners to move their land out of the titling system and into privacy, generating a crowding-out effect (the first term in both expressions, W^{rc} and W^{rg}). For each system, there is a break-even point in terms of land value such that an individual is indifferent between relying on privacy or on the public system. Notice that it is not clear which of the two break-even points is higher.

²⁰ We have here a version of the familiar problem of excessive level of care when private benefits are higher than social benefits. See, for example, Steven Shavell, *The Fundamental Divergence between the Private and the Social Motive to Use the Legal System*, 26 *J. Legal Stud.* 575 (1997).

TABLE 1
SUMMARY OF FIGURE 2: SOCIAL WELFARE WHEN $V_1 > V_0$

	0 to V_0	V_0 to V_1	V_1 to $(Q - R)/(\theta_1 - \theta_2)$	$(Q - R)/(\theta_1 - \theta_2)$ to highest V
Optimal titling regime in each segment	Privacy	Recording	Recording	Registration
Titling decision given recording	Privacy	Recording	Recording	Recording
Titling decision given registration	Privacy	Privacy	Registration	Registration
Gain from choosing registration over recording	0	-A	-B	+C

In Figure 2, recording has the lowest break-even point. There are parcels of land that would be inside the system with recording but outside the system under registration. Area *A* is land that would be optimally recorded but remains under privacy in registration, area *B* is land that would be optimally recorded but is registered in registration, and area *C* is land that would be optimally registered but remains recorded in recording. Figure 3 shows the opposite situation, where registration has the lowest break-even point. Area *D* is land that would be optimally registered but its owners rely on privacy under recording, and area *E* is land that would be optimally registered but is recorded.²¹

Tables 1 and 2 identify the welfare gains and losses for each set of parcels of land. Clearly, *D* plus *E* is strictly positive, however *C* minus *A* minus *B* could be negative, depending on the relative magnitude of *A* + *B* and *C*. The socially preferred titling system is registration if $C > A + B$ and recording if $C < A + B$.

Our result means that recording may be socially preferable to registration for two reasons, both of them disregarded in the previous literature. The first is the higher marginal cost of registration over recording. The second is that because registration is more costly, some parcels of land that would be recorded under recording would remain privately titled and so miss the benefits of publicity under registration.²²

²¹ These welfare gains would be affected by changes in land value. A general increase in value would be equivalent to moving the whole distribution of land to the right of Figure 2, increasing area *C* and making registration preferable. This could account for the dominant move of developed countries from both privacy (England) and recording (Scotland and parts of Canada) toward registration or improved recording (France and even the United States, when considering private title plants).

²² Note also why such an important result could not be reached by Miceli, Sirmans, & Turnbull, Title Assurance, *supra* note 8. For them, recording is always inferior because they assume cost-free titling ($r = \rho = 0$) and, more critically, they disregard the possibility of privacy.

TABLE 2
SUMMARY OF FIGURE 3: SOCIAL WELFARE WHEN $V_0 > V_1$

	0 to V_1	V_1 to V_0	V_0 to highest V
Optimal titling regime in each segment	Privacy	Registration	Registration
Titling decision given recording	Privacy	Privacy	Recording
Titling decision given registration	Privacy	Registration	Registration
Gain from choosing registration over recording	0	D	E

III. EXTENSIONS

We extend here the previous analysis to consider title assurance, land development, and transaction costs, showing how these three aspects may affect the basic results derived earlier. A more comprehensive model is developed elsewhere.²³

A. Title Assurance

In the basic model, we ignored the possibility that current owners can buy title assurance services, understood as the private production of information and contractual services that reduces the probability of forfeiture.²⁴ We will consider title assurance only under recording because, in essence, it is less necessary under registration and less viable under privacy.²⁵

The current owner of a parcel of land valued at V who was offered the full range of institutional solutions would just rely on privacy when the land is not very valuable, would record if its value is within a given interval, would buy title assurance services if the land is valuable but not sufficiently so to justify registration, and would register if the land is highly valuable.

The choice of assurance by individuals is not socially optimal because owners do not care about the benefit of involuntary land transferring (unless transaction costs are such that $\lambda = 1$). Thus, an individual will choose more

²³ Benito Arruñada & Nuno Garoupa, *The Choice of Titling System in Land* (Working paper, Univ. Pompeu Fabra, December 2004).

²⁴ We assume that individuals are risk neutral. Thus, there is no risk motivation for insurance and no social cost from inefficient risk sharing. Hence, we designate activities that reduce the probability of forfeiture as "title assurance" rather than "title insurance."

²⁵ As in Miceli, Sirmans, & Turnbull, *Title Assurance*, *supra* note 8, we take the view that title assurance makes little sense under registration since the registration itself provides full title assurance. This is so because, as analyzed by Arruñada, *A Transaction-Cost View*, *supra* note 3, the low level of title insurance sold in countries with registration merely spreads title risk, whereas in countries with recording, it aims to prevent such risks. In the case of privacy, we assume that title assurance is unavailable because of the difficulties of producing information when hidden property rights are legally enforceable. This is also true as, for land under privacy, precedents of title insurance were limited to occasional provision of a general third-party guarantee against forfeiture and defective title insurance policies for specific and known risks (*id.* at 592-93).

(when $\lambda < 1$) or less (when $\lambda > 1$) assurance than is socially desirable. Some tax or regulation of private pricing for assurance services is therefore needed to reach the socially optimal level.²⁶

Under recording with title assurance, social welfare is no longer given by expression (1) but must take into account that some parcels of land will be recorded without title assurance while others will be recorded with title assurance. With respect to social welfare, title assurance introduces a benefit (the reduction in transaction costs due to forfeiture becomes less likely) and a cost (that of producing the assurance itself). However, under registration, social welfare is still given by expression (2), as before, since there is no private title assurance.

Assurance services somehow alleviate what is a main deficiency of pure recording: leaving titles on highly valuable land subject to too much uncertainty. Therefore, the possibility of title assurance improves the standing of recording over that of registration, and in the spirit of Figure 3, it increases A and B and reduces C , thus making $A + B - C$ more likely to be positive. However, the final result hinges on the ability of the assurance technology to reduce the likelihood of forfeiture at a reasonable low cost. If this is possible, a recording system becomes less of a problem for the most valuable parcels of land, thus diluting to some extent the major advantage of registration. If not, we might end up with no title assurance and a result very close to that given in Section IIB. In addition, if corrective taxation is not well designed, a recording system with title assurance will suffer distortion caused by individuals who, not caring about the benefit of involuntary land transferring, tend to buy more than the socially optimal level of assurance services.

B. Land Development

Most of the literature on property rights in land has been concerned with land investment and the nature and enforcement of such property rights.²⁷ It is therefore important that our conclusions remain valid when capital improvements are considered. A short technical digression will show why.

Parcels of land are worth more after being improved. If the level of capital

²⁶ There is some casual evidence of special taxation. The industry is heavily regulated in both the United States and France. Special taxation takes the form of documentary, mortgage, and transaction taxes that are frequently associated with the use of assurance recording services.

²⁷ See, for example, Gershon Feder & David Feeny, *Land Tenure and Property Rights: Theory and Implications for Development Policy*, 5 *World Bank Econ. Rev.* 135 (1991); Terry L. Anderson & Dean Lueck, *Land Tenure and Agricultural Productivity on Indian Reservations*, 35 *J. Law & Econ.* 427 (1992); Robert C. Ellickson, *Property in Land*, 102 *Yale L. J.* 1315 (1993); Timothy Besley, *Property Rights and Investment Incentives: Theory and Evidence from Ghana*, 103 *J. Pol. Econ.* 903 (1995); Lee J. Alston, Gary D. Libecap, & Robert Schneider, *The Determinants and Impact of Property Rights: Land Title on the Brazilian Frontier*, 12 *J. L. Econ. & Org.* 25 (1996); and Thomas J. Miceli & Joseph Kieyak, *The Economics of Land Title Reform*, 31 *J. Comp. Econ.* 246 (2003).

improvements is k and the cost of capital improvements (whatever the titling system) is $C(k)$, where $C' > 0$ and $C'' > 0$, the return on capital improvements is $(1 + k)V$. For each titling system, the expected value of ownership would be $(1 - \theta_i)(1 + k)V - C(k)$, where $i = 0, 1$, and 2 . The choice of improvements, k_i , is given by $(1 - \theta_i)V = C'(k_i)$, since the appropriate second-order condition is satisfied. By comparing the three first-order conditions, we can conclude that the private choice of improvements satisfies $k_2 > k_1 > k_0$. As we should expect, there will be more investment in land if the parcel is registered rather than recorded or the deeds kept private. Consequently, a parcel of land worth V will have different values after improvements, depending on how it is titled; it will be more valuable if it is registered rather than recorded or just held under privacy. This effect makes registration more suitable for encouraging land improvements.

A second important result is that the private choice of land improvements is not socially optimal, because individuals do not recognize the positive externality such improvements will have for potential claimants. Efficient land improvement for a given system of land titling should satisfy $(1 - \lambda\theta_i)V = C'(k_i)$ for $i = 0, 1$, and 2 . There is overinvestment in land improvement if $\lambda > 1$ and underinvestment if $\lambda < 1$. Therefore, some sort of corrective policy would be needed to achieve socially efficient land improvement. If transaction costs from forfeiture are relatively low, investment would be subsidized, whereas if transactions costs are very significant, investment would be taxed.

Third, social welfare under recording or registration is no longer given by equations (1) and (2) but must include the gains and costs from land improvement. In addition, investment in land and, consequently, land value are higher for registered than for recorded land and are lowest for land held under privacy.

The possibility of land improvements therefore exerts two opposite effects. On the one hand, registration becomes socially more valuable because it leads to more investment, thus making registration superior to recording.²⁸ However, the cost of leaving land outside of the public titling system also becomes higher because investment is lowest for land held under privacy. When these two effects are combined, it is unclear how land improvements affect the possibility of registration being socially more efficient than recording.

C. *The Problem of Transaction Costs*

A major feature of the literature on property rights is the importance of land titling for transactions.²⁹ Creating the right incentives for voluntary

²⁸ A similar conclusion is obtained by Miceli, Sirmans, & Turnbull, *Title Assurance*, *supra* note 8.

²⁹ See Arruñada, *supra* note 1, and references therein.

transactions in land is important because, in order to guarantee efficiency, those who value land more should be able to buy from those who value it less. The right incentives also prevent involuntary transactions by which an individual who values the land more loses it to an individual who values it less.

In this section, we consider the possibility that the seller has better information than the buyer concerning the cost of forfeiture due to future claims. In terms of our model, this means that the different values of θ are private information. The buyer knows that θ_i is distributed in a given interval, where $i = 0, 1$, and 2 represent privacy, recording, and registration, respectively, and she offers a price P to the seller in a competitive market.³⁰ The expected payoff for a risk-neutral seller is $P - (1 - \theta_i)V^S$, where V^S is the value of the land for the seller. Given the price P , the seller accepts the offer as long as θ_i is greater than $1 - P/V^S$. Here we can see the adverse-selection problem: for a given P offered by the buyer, the seller is willing to sell only if the marginal cost of forfeiture (unknown to the buyer) is reasonably high. Therefore, parcels of land with high-quality title will not be traded.

Given the decision of the seller concerning whether to sell, the buyer will choose the price so as to maximize the expected payoff subject to zero profits. Consequently, the price P will necessarily be below the value of the land for the buyer, it will decrease with the expected marginal cost of forfeiture due to future claims, and it will be below the expected benefit for the seller for those parcels of land with low marginal cost of forfeiture (adverse selection).

Clearly, prices will be highest for registered, in between for recorded, and lowest for privately held land. Therefore, the adverse-selection problem will be less marked for registered, in between for recorded, and most marked for privately held land. The rationale is the following: the expected marginal cost of forfeiture is higher for recorded than for registered land; as a consequence, the price offered by the buyer will be higher for registered than for recorded land. A lower price for recorded land drives the better (in terms of secure land title) parcels out of the market, and a higher price for registered land keeps some of the better parcels of land in the market.

The explicit inclusion of land transactions therefore creates two opposite effects. On the one hand, registration becomes socially more valuable because there is less adverse selection and a greater number of transactions. On the other hand, the cost of leaving land outside of the public titling system also increases because adverse selection is highest under privately held land. When these two effects are combined, it is also unclear how the explicit consideration of land transactions will affect the possibility of recording being socially more or less efficient than registration.

³⁰ Therefore, a zero-expected-profit condition will be imposed as a participation constraint for the buyer.

IV. CONCLUSION

In this paper, we have explored the choice of titling system for land, introducing well-established relations for the relative costs and effectiveness of three possibilities: private titling (that is, privacy) and the public titling systems of registration of rights and recording of deeds (the latter with and without private assurance services, which may take the form of private title insurance).

In our model, once a public titling system is in place, owners choose to rely on public titling or to keep their rights private. Consequently, the social choice of title system is given by the net balance of the following effects: recording causes underassurance of higher-value land, while registration causes crowding out and overassurance of lower-value land. The net balance of these effects and, therefore, the optimal title system are determined by the relative cost-effectiveness and pricing of titling (including private title assurance services). Recording triggers underassurance of land that, given its greater value, would be efficiently registered. Conversely, crowding out happens under a system of registration because its higher price leads owners to keep private some lower-value land that otherwise would have been recorded. Similarly, some midvalue land that would have been recorded is registered, causing overassurance. These results are quite general, as they hold, with minor differences, for situations with and without private assurance services, land improvements, and information asymmetry between sellers and buyers of land.

We acknowledge that our results are based on a stylized description of the different titling systems and are more relevant for jurisdictions with no public titling. In addition, we have focused on the ideal models of each system. For instance, assuming that title assurance under recording can never do better in terms of benefits than registration is probably true of the best examples of each system, but dysfunctional registration systems surely perform worse than good recording plus assurance. We think that this assumption, however, is not too restrictive for the problem we are modeling because performances of alternative systems within the same jurisdiction are likely to be positively correlated. The poor performance of registration systems that functioned simultaneously with recording, as the Torrens register did in Cook County, Illinois, is not necessarily relevant for this discussion because the simultaneous presence of both systems complicates the comparison with issues of adverse selection and additional rent seeking.

Notwithstanding, our results have important policy implications that are consistent with institutional observations. First, whatever the titling system, the pricing of public titling and private assurance services above cost is essential for social efficiency because, as forfeiture has greater private than social costs, marginal cost pricing would produce overassurance. This provides a justification for taxing land transactions, to the extent that this tax,

which is often linked to public filing, acts as an above-cost price that limits owners' inclination to overassurance.

Second, the choice of titling system should consider the over- and under-assurance and crowding-out effects, as well as the possibility of avoiding them through corrective pricing and/or intermediate legal solutions. In particular, the government could limit the crowding-out effect of registration by pricing titling services in a way that motivates owners of intermediate-value land to register. More generally, our results provide a rationale for providing legal palliatives under both registration and recording that avoid their specific disadvantages.

Both prescriptions find empirical support in the functioning of most titling systems, as all around the world private assurance is heavily regulated and taxed, reducing overassurance, and land registers apply prices that increase with land value and include a fixed element, which might reduce crowding out and keep the lowest-value land under a system of privacy. In addition, palliatives are widespread. Recording systems often provide a simplified judicial procedure to clear title (the French purge and the American quiet title suit), a solution to the underassurance of the most valuable land. Registration systems usually also allow some kind of inexpensive filing with lesser, or provisional, legal effects. This often takes the form of provisional registration of possessory title, which can be considered a form of recording within a register of rights, and substantially reduces the crowding-out and overassurance effects.

More generally, this paper confirms that the choice of an efficient titling system is an empirical issue that cannot be solved on purely theoretical grounds. It throws two doubts on the certainties that seem to inspire the huge efforts being made by international aid agencies in the development of land titling systems. First, it points to the division between the private and social benefits of title assurance activities. Second, it models the behavior of individuals opting out of filing systems, a common circumstance often forgotten in overambitious titling initiatives.

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