# Introduction

The core of this book is a unique data set I have spent almost ten years compiling and updating. Laws in the jurisdictions studied here are current as of 2018, with the exception of China, whose 2020 new civil code is included.[1] The data set chronicles the substance of property law for the issues covered in this book in at least 156 jurisdictions.[2] That is, every chapter attempts to include an account of relevant law in the same 156 jurisdictions, which includes three U.S. states (NY, CA, and LA) and two Canadian provinces (Quebec and Ontario)[3] (for coding methods and sources, see Method Appendix). On certain issues, this book covers some or all U.S. states and Canadian provinces, as well as looking into provincial civil codes in Mexico. The 247 jurisdictions studied (as shown on the book cover) are where more than 95% of the world population resides.

Two hundred and seventy-nine dimensions of property law in each jurisdiction are surveyed by this book. This is, by far, the largest scale comparative property law tome. Each dimension is treated as a variable in my data set, and addresses a specific question regarding the substance of law (see Data Appendix).

[1] The 2020 Puerto Rico Civil Code thus is not coded. Its 1930 code is studied instead. The 2020 Laos Civil Code (its first ever one) is not coded. Laos' two statutes are studied instead. The 2020 Seychelles Civil Code is not coded. Its 1976 code is studied instead. The 2021 new Book 3 of the Belgium Civil Code regarding property is likewise not coded.

[2] Twelve South Pacific countries were coded as one jurisdiction because the only source available treats them as a collective unit (Farran 2013). Mexico is a federalist country with a federal civil code, and all the 31 states and federal district have their own civil codes, many of which are modeled after the federal one and are substantially similar. Except in Chapters 5 and 10, only Mexico's federal civil code is considered. Although Australian provinces do not have exactly the same law, this book takes New South Wales law as the basis to code "Australian" property law.

[3] Most observations in our data concern nation states, but 10 other jurisdictions were also coded, each as one observation. In addition to the American states and anglophone Canadian provinces, I coded Quebec, Scotland, Puerto Rico, Hong Kong, and Macau.



https://doi.org/10.1017/9781009236553.001 Published online by Cambridge University Press

## I Three Approaches

As the book title suggests, this book fuses three analytical approaches. Each of Chapters 3–13 follows the same format. Part I is a comparative law overview and the law is often summarized quantitatively. Part II (sometimes broken into multiple parts) provides an economic analysis of the doctrines in question and often provides empirical examinations of the discussed economic theories. Chapter 1 and several other chapters use quantitative methods to describe the variations in property law.

### *A Comparative Analysis*

The comparative analysis in this book focuses on the substance of property law. Put differently, black-letter legal doctrines take center stage. Prior comparative law studies are concerned mostly with the laws in certain developed countries; as a result, many interesting legal schemes addressing well-known problems have been ignored. One contribution of this book is to introduce to readers to interesting legal solutions adopted in under-studied countries.[4]

Chapters 3–13 each start with a typology of a single doctrine, or of multiple related doctrines. The typologies in each chapter are my own. Other scholars could reasonably come up with different ways to conceptualize and categorize the various legal schemes.

Inevitably, this book may sometimes misclassify certain countries because laws on the books differ from laws in action.[5] A "wiki" project that I would like to initiate following the publication of this book would hopefully reduce comparative law coding errors. That said, whether as a comparative exercise for its own sake, or as a springboard for economic analysis, the more important – and less error-prone – takeaway is the prototypes identified in each chapter. The prototypes are distinct real-world schemes addressing legal issues. Many of these prototypes have not been subject to legal analysis in English, not to mention economic analysis. The objects of my economic analysis are the prototypes, not laws in individual countries.

Comparative analysis in this book takes account of, but looks beyond, the different "styles" of property law. Chang and Smith (2012: 4–5; 2016:

[4] This book thus uses the new private law theory proposed by Grundmann et al. (2021: 2–3).

[5] In addition, the law in books in civil-code jurisdictions reflect legislatures' policy choice, while the law in action there reflects courts' law-making. A systematic analysis of legislature's choice of designs in a particular doctrine should be of interest in and of itself.

132–133) distinguish the "structure" and the "style" of a system of property law. The structure of property law refers to how property law groups problems so that they need not be treated in a fully articulated fashion. Serving the essential function of property – protecting uses in a world of positive institution costs – still leaves a great deal of freedom in terms of how to serve those objectives within a legal framework. Style describes a characteristic manner of doing things. In property law, one example of style would be the reliance on possession and a more implicit definition of ownership in common law systems versus the definition of dominion and departures from it in typical civilian systems. Likewise, a lease can be a contract given *in rem* protection or can be delineated as an *in rem* right of a limited scope (Chapter 3). To give another example, in civil law countries, *rei vindicatio* – the action to force someone to return possession of a thing to its owner (Brandsma 2015: 11) – is the major right of a property owner, while this expression is almost untranslatable into legal terminology in English ("revindication" is the usual English word, which means nothing to common-law lawyers) (see also Graziadei 2017: 73–76). Property owners in the common law, of course, are generally well protected – by different means with different labels (trespass, conversion, replevin, and so forth).

Thus, in comparing law across jurisdictions, it is often necessary to pierce through the veil of style and examine the functioning of a particular legal rule within the property structure. As Chapter 3 shows, while many limited property forms have different names, coding them differently would be to mistake style for function. Chapter 6 also demonstrates that countries may use different doctrines to tackle similar legal issues. One takeaway point of the comparative exercise in this book is that common law and civil law are not that different if one looks beyond stylistic differences.

## *B Empirical Analysis*

In terms of empirical analysis, this book is situated in the emerging trend of empirical comparative law, already thriving in constitutional law (e.g., Elkins et al. 2009; Gutmann et al. 2014; Law 2016; Chilton and Versteeg 2020), antitrust law (e.g., Bradford et al. 2019b), and corporate law (Armour et al. 2009; Spamann 2009a; 2009b). My property data set appears to be the only systematic coding of legal substance within private law. Chapter 1 uses unsupervised machine-learning methods to draw a legal family tree for the studied jurisdictions. In other chapters,

my property data set, and external data sets such as World Bank's *Doing Business* indices, are also drawn on to demonstrate correlations of studied legal dimensions and explore potential explanations for observed divergence across countries.

### C *Economic Analysis*

The second part of each of Chapters 3–13 analyzes which of the existing legal schemes is more efficient.[6] Existing law-and-economic analysis often uses stylized mathematical models to identify an efficient mechanism, but traditional lawyers often find such models irrelevant – sometimes rightfully so. As Chapters 4 and 11 show, the prior stylized economic analysis missed important real-world features of law. Mathematical models grounded in realistic legal conditions will make a direct impact on the legal system. This book always starts with the economic analysis of real-world legal schemes. Even though these existing schemes may not be the best solutions, as they are the current law, it should be interesting in and of itself to know which legal schemes are more efficient. Each chapter closes with a conclusion on which legal systems have adopted more efficient rules. Sometimes, when none are clearly efficient, a theoretically more efficient and practically realistic scheme will be discussed.

Comparative law and economics (De Geest and Van den Bergh 2004; Faust 2008; Eisenberg and Ramello 2016) brings to the table economic analysis of one national law may lack. Looking at a single national law and considering a possible economic rationale, analysts may subconsciously assume the efficiency of their own legal system. Chapter 10 offers such an example. Posner (1973) famously claims that the common law tends to be efficient (for a review, see Depoorter and Rubin 2017). Had the common law been compared head-to-head with rules in other countries – like what I do in this book – Judge Posner may have qualified his claim. The upshot of comparative economic analysis is that there are at least two legal schemes under scrutiny, and their relative costs and benefits must be

[6] As Merrill and Smith (2020: 138) caution, only if a doctrine is relatively separable from the system does it make sense to ask whether it is efficient. This book will remind readers of relevant, supplementary, or alternative doctrines that could deal with the issues in question. Meta-law (see below) is often not embedded in specific property doctrines and thus will not always be discussed in the individual chapters. Readers should keep in mind that in some jurisdictions more than others, equitable provisions may intervene to replace inefficient rules as applied to specific contexts.

examined. By contrast, analysis of one national law often implicitly compares the legal scheme in question with no legal scheme at all, thus giving the legal scheme, whatever its design, an edge.

Using plain language instead of formal mathematical models, I aim to introduce to traditional property scholars the power of economic analysis. Chapter 2 will define efficiency and introduce the economic tools used in the following chapters. Providing a detailed description of real-world institutions, this book invites economists to further model them. As the following chapters show, some interesting topics have not yet caught the attention of economists. I hope that this book serves as a new starting point for future economic modeling.

The economic analysis in this book is both positive and normative. It is positive, as each chapter demonstrates the allocative benefits and institution costs each legal scheme (i.e., prototype) entails. It is normative because based on the normative prior that efficiency is one important social value (Chapter 2), this book proposes that efficient property schemes should be a strong candidate for legislative adoption, especially when the most efficient scheme does not create more inequality of wealth or income than other possible schemes. The use of economic theories as an external approach to the study of property law makes this book a New Private Law study as defined by Gold et al. (2020).

Economic analysis is often used to explain why lawmakers adopt certain legal rules or why certain legal phenomena emerge (Kornhauser 2022). As explained below, this book adopts an explanatory theory that uses whether a property doctrine is isolated from other parts in the legal system to explain why property law schemes sometimes converge and sometimes diverge. The whole book can be considered to offer dozens of empirical studies on theories on convergence and divergence of law. Chapter 2 emphasizes the role of third-party information cost in explaining the difference between property law and, that is, contract and torts law. These two explanatory perspectives are used throughout the book. In some chapters, an additional type of explanatory analysis is offered. Those chapters attempt to tease out whether differences in national cultures drive the variation of property laws across the globe.

## II Engagement with Existing Theories

This book proposes no grand theories – that is deferred to my next book. Nonetheless, the book sheds light on several prominent theories, introduced below. In addition to reading each chapter separately, readers can

also read Chapters 3–13 together as preliminary empirical evidence for (or against) these high-level theories.

### *A Convergence and Divergence of Property Law*

Is this the end-of-history for property laws (cf. Hansmann and Kraakman 2000a)? Meaning, do property laws converge over time? While this book is not able to empirically examine this question (due to the lack of panel data on property law), starting with certain reasonable premises, it provides rich empirical tests for the theory of Chang and Smith (2019) on whether and why some aspects of property law converge while others diverge.[7]

Again, the structure versus style framework is useful. Structure and style raise the issue of how tightly a given aspect of property law is integrated into the overall system. Private law doctrines that are most integrated into the overall system are the most difficult to change; doctrines that are easily treated in isolation, with fewer ripple effects, are conversely much easier to modify (Smith 2015: 2067–2074). In property law, the various doctrines and institutional features occasionally interlock. Those that are highly interconnected with the rest of the system, like possession (Chang 2015b), are difficult to change, in contrast to doctrines that can safely be treated in isolation, like the form of common-interest communities.

Structures of property do appear to converge, if not being very similar to begin with. As this book will show, most jurisdictions address the same types of property issues. This suggests that the problem of serving property's functions at positive information cost everywhere creates the same disputes. Uncertainty over ownership gives rise to the acquisitive prescription doctrine (Chapter 5). High costs of verifying true owners of

[7] Amnon Lehavi pushed me to think about how and why this framework may or may not explain convergence and divergence in other fields, such as copyrights. My preliminary thought is that intellectual properties and antitrust regulations are less appropriate to be analyzed in this framework, as legal changes there have not been spontaneous. Rather, superpowers such as EU and the United States have interests in exporting their antitrust laws (Bradford et al. 2019a) or imposing their stronger IP protections. Areas that are subject to stronger jurisdictional competition, such as corporate law or trust law (Sitkoff and Schanzenbach 2005), may also be ill-suited for the framework here.

Lehavi also pointed out that testing the framework by studying cross-country efforts to harmonize laws, such as Europe hypothec and DCFR. Chang (2016c) studies the provision on possession in DCFR and finds the provisions too complex and self-contradictory. These possession provisions are not adopted also because possession is one of the most interconnected concepts in property law. Full treatment of this issue is beyond the scope of this book.

movables lead to the good-faith purchaser doctrine (Chapter 10) and the accession principle (Chapters 12 and 13). Use rights and security rights, while often bearing very different names, are staples in virtually all property systems (Chapter 3).

The exact contents of property doctrines do not necessarily converge. Lawmakers around the world face the same issue of positive information costs, but the same problem does not always call for the same solution. Information costs only force legal systems to come up with a solution, but perhaps sometimes anything goes (Levmore 1987; Dari-Mattiacci and Guerriero 2019). Many, if not most, doctrines mix structural and stylistic aspects. When lawmakers for any reason settle on a solution, etched in civil codes or leading cases, they do not always have strong reasons to change the solution to become more like other jurisdictions.

Solutions are more likely to converge if the doctrine in question is more isolated from other doctrines. This is true of structural and especially of stylistic aspects of law. In an interconnected doctrine, such as the definition of possession, convergence with other jurisdictions that require deviation from the status quo forces other pieces in the whole system to go along with the change. In civil-code jurisdictions, in particular, fear of unintended consequences arising due to changes to foundational doctrine in a civil code could kill any proposal for deviation. France and Germany each have their own conceptual system of possession, which is hard to uproot after hundreds of years of doctrinal interpretation. When European scholars proposed the Draft Common Frame of Reference (Perez and Liguerre 2019), they neither found common ground nor simplified the concept. Instead, they opted to maintain the two conceptual systems of possession – creating much confusion and contradiction (Chang 2016c: 11–23).

By contrast, a more isolated "downstream" doctrine (Levmore 2019) will have more wiggle room, as, in the worst-case scenario, a failed experiment would not drag down the whole system. Co-ownership partition is a prime example of such a doctrine (Chapter 7). A majority of the studied jurisdictions prefer partition in kind and allow some forms of sales. Easement of necessity law also shows strong signs of convergence (Chapter 9). In addition, almost all jurisdictions with the *specificatio* doctrine use one (or both) of the two tests (Chapter 12). The widely adopted condominium form (70% of studied jurisdictions) is another example.[8]

[8] Druey (2004: 100) notes that in Switzerland, the condominium form was statutorily sanctioned in 1965 due to economic need, even though earlier it had been considered inconsistent with other parts of the co-ownership law.

To be sure, isolation and interconnection are not the only reasons for doctrines to converge or diverge. Many other factors – the benefits of convergence, for one – affect lawmakers' decisions. That is, large benefits of convergence may push interconnected doctrines toward convergence. European efforts to streamline the registration of mortgages is a case in point (Erp 2002: 86). By contrast, small benefits associated with convergence will leave isolated doctrines untouched. Doctrines related to boundary encroachment (Chapter 6), accession (Chapter 13) and finders (Chapter 11) are three such examples. If there is a globally efficient solution to a legal issue, countries' inclination to adopt it will be observed as convergence. When a legal issue only has locally efficient solutions, meaning what is efficient is contingent on other institutional features, countries' inclinations to adopt efficient solutions will be observed as divergence. Prime examples of this point are seen in the adoption of the public faith principle (Chapter 4) and possession-based acquisitive prescription (Chapter 5), which depend on the capacities of local registries.

Approaches to convergence and divergence are rooted in a combination of relative propensity to change and relative closeness of starting points. In a system like property, change over time will flourish or be cut off depending on the resultant fitness of the overall system. Alston and Mueller (2015) demonstrate that the various elements of the bundle of rights may be relatively isolated or show "epistatic" connections. In an epistatic connection, a change in one element will lead to an effect on a connected element. Thus, the right to draw water affects the value of the right to grow tomatoes, but the right to prevent airplane overflights is unconnected to either the right to draw water or the right to grow tomatoes.

Once epistatic connections are in the picture, the implications of different patterns and densities of epistatic connections for the evolution of property rights are likely to be quite important. Along a spectrum, three types of scenarios can be distinguished. First, the elements in the bundle of rights might be wholly unconnected. If one gets the answer right for each element, then all one has to do is add up the effects of all the elements, and one can be assured that the entire bundle is optimized. If so, it is easy to change individual elements without the downside of severe, unrelated (by epistatic connection) negative effects emerging in the bundle. However, assuming epistatic connections away is unrealistic, even if convenient.

At the opposite extreme is maximal epistatic connection: everything is connected to everything else. If so, the pattern of consequences to minor variations in one element of the bundle is random or chaotic and very difficult to predict. This pessimistic picture similarly fails to describe our

world. Some problems, like high-altitude airplane overflights, can indeed be treated in isolation.

In between these two extremes of zero and total connectivity is what has sometimes been called "organized complexity" (Smith 2019; 2020; 2021b). Here, epistatic connections are important but far from universal. They can also be clustered. Innovation is promoted by the fact that interconnection is not complete and is semiorganized. Changes to part of the bundle can be made, and the overall effect can move in the direction of a local optimum more easily than under complete connection.

Notions of essential function and interconnection allow us to form expectations, or even predictions, about the convergence and divergence of property systems. Structural aspects of modern property systems that solve the basic problem of managing use conflict, and avoiding intractability will cause some convergence on the exclusion-governance architecture (Smith 2002). To be sure, the relative emphasis on exclusion and governance will vary according to local conditions, and in particular, it will be easier to add, subtract, or modify governance rules than it will be for analogous changes to the exclusionary setup (Smith 2004a; 2004b; 2012b). Property systems will converge in having a mix of exclusion and governance and will diverge more in the area of governance than in exclusion, as exclusion is one essential element in property. Co-ownership management is a prime example. While everywhere in the world a single co-owner is entitled to act alone in evicting outsiders, countries differ in requiring a majority, super-majority, or unanimous vote to govern the co-owned resources (Chapter 8).

Because in general stylistic variation is more detachable from the system, divergence more easily arises in governance than in exclusion. Thus, the **first proposition** is that structural aspects of property law should show convergence and the structures in question should be stable over time. More tellingly, even if the initial condition of the property structure is no exclusion at all, this arrangement is unlikely to persist if open-access commons do not make sense on its own terms (i.e., it fails to provide benefits that exceed the costs, or compares unfavorably with other possible arrangements). A prime example is the people's commune during the Cultural Revolution in China. Private property and individual farming had been the norm and practice, but during the revolution, the government mandated a shift to limited-access common property. As is well known, this social experiment did not last long (Coase and Wang 2012). The structure of property law, therefore, will converge to an exclusion-based system, regardless of the initial conditions.

Regarding more stylistic features, those which are more or less interconnected with the rest of the system of property law must be distinguished. The **second proposition** holds that, in any less interconnected aspect of the property system, more stylistic variation can be expected. The **third proposition** is that the less interconnected an aspect of the property system is, the more it could change over time. One reason for change is voluntary borrowing, or legal transplant, due to colonialism (Berkowitz et al. 2003a; 2003b; Klerman et al. 2011). Previous work has found that in the admittedly small number of mixed systems that have both common and civil law heritages, there is a tendency to borrow contract law more than property law (and never the latter without the former) (Palmer 2001: 57; Kim 2010: 711–714), and within property law to borrow more in the *in personam* than in the *in rem* aspects (Merwe 2003: 274–289). Thus, in terms of changes over time, stylistic features would converge or diverge, but more rapid changes will occur in less connected, rather than in more connected, areas of property law.

Now, after decades, or even centuries, of evolution in property law, it is more likely to observe the convergence of isolated (less interconnected) doctrines, if at least one of the following conditions holds: (1) there is one or a few apparently dominant strategies; (2) convergence in a global market saves transaction costs and attracts investment and business; or (3) there have been conscious or subconscious, voluntary or involuntary borrowing or legal transplants, with or without explicit efficiency concerns. The key point is that less interconnected doctrines are more likely to vary (resulting in divergence or convergence depending on background conditions) than more interconnected ones.

This book uses a snapshot of current property systems. The third proposition – that the interconnectedness of doctrines should correlate with rapidity of change – cannot be tested with the available data. As for the first two, assuming that systems are not subject to overwhelming pressures to converge, the reasonable conjecture of our world are that, first, the basic structure is highly systemic and so should show more convergence than do more structurally peripheral aspects. Second, among styles of property law, those that are connected to the rest of the law retain their greater diversity. This is based on the particular conditions of our world where the common and civil law have very different starting points (styles) in terms of property law (Chang and Smith 2012: 36–54). The civil-law system is inherently plural. Hence, what is more interconnected has different starting points and remains divergent, whereas what is less interconnected could diverge or converge due to one or more of the three forces laid out above. Table 0.1 summarizes the theoretical framework.

Table 0.1 *Convergence–divergence hypothesis*

| Aspects in property system | Initial conditions | During evolution | Observed outcome |
|---|---|---|---|
| Structure | Same (exclusion-governance based system) | Remain | Convergent* |
| Structure | Different (e.g., open access) | Cannot sustain | Convergent |
| Style, interconnected | Same | Hardly change | Convergent |
| Style, interconnected | Different | Hardly change | Divergent* |
| Style, isolated | Same | Vary | Divergent (by definition, cannot become convergent) |
| Style, isolated | Different | Vary (e.g., borrowing, transplanting, efficiency conformity) | Convergent* |
| Style, isolated | Different | Vary (e.g., for national identity; cultural difference) | Divergent |

*Note:* * marks the situations in most jurisdictions.

### *B Law versus Meta-Law*

Another theory that can tie together the comparative materials is law versus meta-law (equity) (Smith 2021a). As Smith (2003; 2012a) points out, private law in general, and property law in particular, employs the principle-exception structure, with exclusion being the principle, and governance the exception. Here, law is the principle and meta-law (equity) the exception. Put simply, ideally the baseline rule in property will be crystal clear, whereas exceptional applications of meta-law may be patternless, so as to deter opportunism.

Chapters 4, 5, 6, 9, 10, 12, and 13 deal with doctrines where a key aspect is whether to distinguish between good-faith and bad-faith parties, and whether the legal protection afforded to them should differ. One

paradigm is to have mostly clear rules and leave all equity issues (including good faith versus bad faith) to a separate body of law – in common-law systems, equity law; in civil-law systems, perhaps unjust enrichment, the principle of good faith, or other untailored legal standards. The ongoing Restatement of Law Fourth, Property, is moving toward this direction. The other paradigm is to spell out all the related concerns and carve out exceptions within each doctrine. Which paradigm is a better fit for a certain country may depend on its legal culture.

In addition, the two chapters on co-ownership, Chapters 7 and 8, also deal with meta-law. The new partition approach championed in Chapter 7 has in mind co-owners' strategic bargaining and bidding behaviors and does the best it can to ameliorate such ill incentives. This is of course consistent with the core function of suppressing opportunism in meta-law (equity). Chapter 8 discusses when courts should have the power to delay partition request and to break no-partition covenants. These are equitable doctrines in common-law jurisdictions.

### *C Are Judge-Made Laws Generally More Efficient?*

Posner (1973) famously claims that common law tends to be efficient while statutes tend to be inefficient. Civil codes are, of course, statutes. To address this claim from the current causal inference paradigm would be a challenge – there is no counterfactual. That is, unobservable is a parallel world in which everything is the same except that the rule in question is made by court rather than by legislature. Judge Posner's approach is to demonstrate that judge-made law in the United States is generally efficient while U.S. statutes – governing, among others, public law issues – is often inefficient. This book's approach is to observe the same property doctrines across the world and to ascertain whether judge-made schemes or statutory schemes are more efficient. The conclusions in Chapters 3–13, read together, do not support the view that common-law jurisdictions tend to have more efficient property law, casting doubt on Judge Posner's claim.[9]

### *D Legal Origins and Legal Families*

Economists discuss legal origins while lawyers discuss legal families. The two concepts are largely the same, but do these concepts accurately

[9] For other recent empirical endeavors, see Niblett et al. (2010), Niblett (2017), Niblett (2020), and Chang (2020c).

describe the legal substance? The question is particularly acute for legal families because the concept does not refer to the past, but the present, suggesting that one may make an educated guess about similarities between the laws of two countries once it is known whether they belong to the same legal family. Chapter 1, using the property data set in unsupervised machine-learning algorithm, shows that the traditional legal family classification does not map onto the quantitative results based on my coding of property doctrines. Bradford et al. (2021) further show that the traditional legal family classification is utterly useless in antitrust law and only marginally useful in property law. To the extent that lawyers need the concept of legal family to have a sense of how similar a pair of countries' laws are, the legal family concept must be rethought.

Moreover, my empirical analysis suggests that notable variations exist even within a legal family. The traditional idea is that comparative lawyers can select one representative country from each legal family and simply compare these presumably prototypical countries (Zweigert and Kötz 1998). My analysis suggests that illuminating doctrinal designs may be unduly ignored under this approach. True, comparative law has evolved. The most recent trend is to move beyond the legal texts and compare the law-in-action across countries. Still, comparative law should be empirical (Spamann 2009c; 2015) no matter whether law on the books or law in action is studied, and comparative lawyers cannot safely ignore less studied countries.

## III Terminologies

Throughout the book, in addition to consciously using Hohfeldian terminologies (Hohfeld; Balganesh et al. 2022), I will use the following terms according to the defined meaning.

1. Bad faith = know or should have known = *mala fide* = has knowledge.
2. Good faith = do not know = *bona fide* = good faith = no knowledge.
3. Civil-code jurisdictions: 105 studied jurisdictions have a civil code, and all but California are considered civil-code jurisdictions. Bulgaria, Croatia, Estonia, Macedonia, Senegal, Serbia, and Slovenia do not have civil codes but have stand-alone statutes that cover nearly all property law (though sometimes only the immovable aspect). These seven countries are considered civil-code jurisdictions. In total, there are 111 civil-code jurisdictions and 45 no-civil-code jurisdictions.

4. Immovables and movables: To save space, immovable and movable are used as countable nouns. (Im)movables will be used instead of (im)movable properties or (im)movable things. Immovables are often called realty, real estate, or real property, whereas movables are often called personality, personal estate, personal property, or chattel. But these alternatives will not be used unless necessary.[10] Movables are limited to tangible (or corporeal) things. Intangible (or incorporeal) objects of property relations are called as such. Of course, things themselves and the (Hohfeldian) relationship regarding them should be distinguished, and this will be the topic of my next book. To simplify, this book often opts for the shorter descriptions. Also for brevity, this book uses land ownership to refer to fee simple absolute in common-law systems.
5. Registration: Registration is used as the umbrella term for the two major types of immovable information depository: registration-of-rights (including the Torrens version) and recording (elsewhere sometimes called recordation or registration of documents). A registration-of-right system "is always done in the form of a *realfolium*, i.e. ordered by the land registered." By contrast, a recording system "is normally done in the form of a *personalfolium*, i.e. ordered by the name of the respective owner" (Schmid and Hertel 2005: 32). The *personalfolium* is called the grantor-grantee index in the United States. Some jurisdictions in the United States also have a track index, similar to *realfolium*.
6. Jurisdictions: It is impossible to be comprehensive. "No jurisdiction" in this book means "no studied jurisdictions," and I write as if studied jurisdictions where I have not been able to find relevant stipulations surely have no relevant rules. The over-confident tone serves to save space and shorten the prose. Jurisdictions include both countries and subnational entities like Louisiana.
7. Restatement of the Law Fourth, Property: The Restatement is an ongoing project by American Law Institute (ALI) to describe American common law. ALI has granted me (as an Associate Reporter) permission to discuss the draft Restatement in this book. The cited sections and notes in this book have not yet been approved by ALI members.

The book tries to strike a balance between coining new concepts and using existing terms as functional categories. As readers will find, statutes and codes in different jurisdictions often use the same term (sometimes

[10] The term "real property" refers to land only in some countries, while in others this term means "relating to things" and thus includes movables.

with linguistic variations) in somewhat different ways. Using existing terms brings familiarity to some readers but unavoidably confuses others. Therefore, this book attempts to define each key term functionally and readers should be careful not to take certain terms' meaning for granted.

## IV Overview of the Book

The book is divided into three parts. The first provides a holistic empirical view of the entire data set, lays out the economic framework, and looks into rules regarding voluntary transactions. The second contains five chapters regarding immovables, while the third includes four chapters on movables. The doctrines discussed in the latter two parts all involve noncooperation or outright intentional infringement of others' property rights.

Chapter 1 makes use of two empirical approaches. Its first part uses property law from 136 jurisdictions in an unsupervised machine-learning method (hierarchical clustering) that divide these jurisdictions into 10 legal families. Unlike the traditional wisdom that highlights the difference between common law and civil law, this chapter finds that, in terms of property doctrines, a trichotomy better describes the legal systems: one big group is jurisdictions affected by French property law; another big group is composed of jurisdictions that follow or resemble German property law; and the final group contains common-law jurisdictions, Nordic countries, and a number of socialist jurisdictions. The second part of Chapter 1 re-combines 156 jurisdictions into 149 countries, and computes the correlation coefficients among each country pair, to show dyadic similarities in property law.

Chapter 2 defines efficiency. The efficiency criterion here is cost–benefit analysis, where cost is institution cost (including information and transaction costs) and benefit is what is called "allocative efficiency" in the literature. My efficiency criterion builds on 60 years of law-and-economics research in property law, but I believe that this is the first time that efficiency has been formulated in this way. Chapter 2 positions efficiency as a first-order value, while welfare is a second-order value that includes efficiency and other first-order values such as distribution of wealth. In addition, Chapter 2 introduces the concepts of *ex ante* viewpoint and the property rule versus the liability rule, both of which will be drawn on in later chapters.

This book's comparative exercises start with Chapters 3 and 4, as both concern voluntary transactions (embodying the governance strategy) and the legal constraints. The *numerus clausus* principle and the mandatory

rules in property (such as the requirement to register land sales) and the legal constraints, and yet in the transaction context, the baseline is that the law does not compel any transaction; rather, the law only sanctions certain types of transactions.

As said above, due to positive institution cost, the exclusion strategy is the foundation of all property systems. The book does not directly address exclusion, but exclusion is always the starting point of all the analysis. Thus, adverse possessors should be evicted, and encroaching buildings shall be torn down. Chapters 5 and 6 deal with the question of how to justify the acquisitive prescription doctrine and the building encroachment doctrine, which deviates from the exclusion strategy.

Chapters 7 and 8 focus on co-ownership. Co-owners can of course manage properties within the legal constraints. These two chapters analyze rules that deal with the dire situation when collective agreement cannot be reached.

Exclusion is the starting point but not always applied. Otherwise, the Book on Property in the civil codes could be very short. Instead, civil codes often spill ink on exceptions to the exclusion strategy. Chapter 9 deals with the involuntary governance strategy applied in the landlocked land context. Neighbors cannot completely shut down access by their landlocked neighbors. Chapter 9 explains why.

Turning to movables. Movables have traditionally been viewed as less important than land, but the rise of intangible property rights and intellectual property rights have given rules regarding movables a more salient position. Chapter 10 focuses good-faith purchase. The doctrine's high-profile application in stolen arts and analogy to copyright law (Balganesh 2016) provide self-evident explanation for inclusion in the book. This chapter circles back to Chapters 3 and 4. Here, two good-faith parties do not necessarily make a valid transaction. The substance of this doctrine, like the designs in Chapter 4, is instrumental in reducing institution cost.

Although not many people have (literally) hit the jackpot, perhaps every person has found a lost item or two during her life. Chapter 11 discusses the finder doctrine, which is often mentioned in English textbooks on property when it comes to the section on the relativity of title. Yet many countries view finders in an entirely different way. This chapter analyzes how to design the finder doctrine so as to keep movables in the hands of higher valuers.

Finally, Chapters 12 and 13 address the accession principle, which serves as the foundation of property law but has been rarely drawn on in court cases, as the legal doctrine is preempted by contracts. This book uses the accession to emphasize the import of putting bad-faith parties in check.

More specifically, Chapter 3 focuses on the *numerus clausus* principle and the limited property rights. It first documents that about a quarter of jurisdictions explicitly adopt this principle, while many others do so implicitly. Chapter 3 argues that this principle is generally efficient. Chapter 3 will also show that property forms such as mortgage (called *hypothec* in civil law) and real easement are extremely popular.

Chapter 4 focuses on how ownership of immovables and movables are transferred (i.e., whether registration is not needed, necessary, or creating opposability to third parties), whether registration creates absolutism (public faith principle), whether a real agreement is conceptually separate from a sale contract, and whether an invalid sale contract always leads to the invalidity of a real agreement (non-causa principle), and whether delivery or certain intentions are required to transfer ownership of personal properties or the sale contract itself is sufficient. This is where the traditional idea of legal families is conspicuous. Transfer doctrines involve how notice is given. The choice of registration system demonstrates how states, given path dependence, trade off transaction costs and third-party information costs. Which type of conveyance doctrine regarding immovables is efficient is contingent on factors outside of the law. It is easier to reform conveyance doctrine regarding movables, and lawmakers should provide alternative default rules ("menus") more frequently and establish clear opt-out procedures ("altering rules").

Chapter 5 analyzes acquisitive prescription, a broader concept than adverse possession, and argues that registration-based acquisitive prescription with title and good-faith requirements can be justified by efficiency under certain conditions – Possession, however, is redundant, and may even give rise to undesirable outcomes. Given that boundary disputes can be left for another doctrine, possession-based acquisitive prescription – no matter whether possessors act in good or bad faith – can hardly be justified on an economic basis in countries with well-functioning registrars if possessors do not have title. The possession-based acquisitive prescription can only be justified in jurisdictions with dysfunctional registrars.

Chapter 6 discusses building encroachment, which is a topic closely related to adverse possession – at least in the common law. Chapter 6 documents the three different doctrinal approaches to dealing with encroachment over boundary and focuses on the building encroachment doctrine enacted in 52 jurisdictions. The prompt protest rule and encroachers' not acting in bad faith are easy to justify economically (though not universally adopted). Encroachers' good faith is increasingly unlikely given

the advance of mapping technology. A two-tier building encroachment doctrine (with safe harbor and sure shipwreck) is best. Even though this doctrine has been used as an example of a put option, it is not, and will be inefficient if treated as such.

Chapter 7 summarizes the various partition approaches used around the world, finding that partition in kind is often preferred, with selling co-owned things through public or internal auctions a common back-up plan. Perhaps as a result, the existing literature has focused on partition in kind and partition by sale, while ignoring intermediate partition approaches like partial partition that are prevalent in practice. Little attention has been paid to the use of revelation mechanisms such as self-assessment, nor to how judicial partition rules affect co-owners' prejudicial-partition behaviors. Chapter 7 brings partial partition into the theoretical framework and proposes a new and feasible partition method that utilizes private information among co-owners and makes partition more efficient.

Chapter 8 first provides an overview of the stipulations regarding how things held in tenancy in common (the most common co-ownership form of property around the world) should be administered and sold, as well as co-owner agreements not to partition. Then, Chapter 8 addresses whether the several types of rules lead to underuse or overuse – that is, whether tenancy in common may lead to tragedy of the commons or anticommons. The prevalent doctrine that provides one co-owner with a unilateral power to call for partition avoids a long-term tragedy but underinvestment and underuse of co-owned resources are still likely. This chapter ends with a proposed solution to ameliorate the underinvestment and underuse problems.

Chapter 9 studies access to landlocked land and shows that most jurisdictions aptly use a mixture of *ex ante* and *ex post* viewpoints to design their doctrines. This chapter follows American parlance and divides the doctrine into "easements of necessity" and "statutory easements." They have intuitive appeal: for statutory easements, owners of servient land should be compensated; easements should be necessary; and the location of the passage should cause the least damage to the servient land. As for easements of necessity, the landlocked owners can only gain access to land held by the grantor at the time of the conveyance. The prevalent scheme under statutory easement to solve this legal entanglement is neither the property rule nor the liability rule, but a "hybrid rule," an unheralded mixture of the property rule and liability rule. Chapter 9 argues that the hybrid rule is efficient because it strikes a balance between facilitating voluntary transactions through reducing transaction costs, reducing

cost externalization, and preserving property value. More specifically, the hybrid rule stipulates that the extent of statutory easements should be set at where the marginal social benefit of prescribed passage sharply declines, and passage locations should be determined following the least damage rule. As for easements of necessity, the limited access rule and the gratuity requirement make economic sense from an *ex ante* viewpoint. Overall, the law leaves ample room for private negotiation, which is more likely to lead to the most efficient outcome than either *ex ante* rule-making or *ex post* judicial adjudication.

Chapter 10 identifies 21 variants of the good-faith purchase doctrine, which are often different combinations of several key factors. That said, none of the 21 schemes are the most efficient. Among the forms of good-faith purchase doctrine currently in use, the market overt rule comes closest to *ex ante* efficiency because original owners, merchant dealers, and consumers all have incentives to spend close to optimal costs on verification and prevention, and the movables in question are more likely to be in the hands of higher valuers. Drawing on mechanism design literature, Chapter 10 argues that when both an original owner and a consumer are nonnegligent, the two parties can be assigned 50% shares of the movable in question, and an ensuing internal auction between them can *ex post* tease out who values the resource more. This internal auction design is inexpensive to administer.

Chapter 11 observes that "finders, keepers" is in fact a minority rule globally. Finders often have to wait for several months to receive any benefit, and often cannot acquire ownership of the found items. Instead, they may receive rewards from the losers or from the state. The current economic analysis of this issue does not map exactly onto the doctrine itself. The better economic justification for the finder doctrine is that providing rewards induces finders not to misappropriate found items or leave them alone.

Chapter 12 discusses the *specificatio* (mistaken improver) doctrine. About two-thirds jurisdictions have this doctrine, and the doctrinal structure is highly convergent. Most of these jurisdictions limit the application of the doctrine when the nonconsensual improvement is irreversible, and most assign sole ownership to either original material owners or improvers. Almost all jurisdictions adopt the disparity-of-value test and/or the transformation test, but there are eight ways that bad-faith improvers are treated. The disparity-of-value test, in and of itself, does not tend to assign ownership to higher valuers, however. While no *ex ante* rule-making can ensure allocative efficiency *ex post*, requiring both the disparity-of-value test and the transformation test is more likely to

increase efficiency. Lawmakers looking for a radical reform proposal may also adopt the internal auction mechanism to resolve the problem in *specificatio*. Besides, even good-faith improvers should not be compensated, as the nontransformative, low-value-increasing improvements are unlikely to be what material owners want. A clear rule of no compensation also decreases litigation cost.

Chapter 13 focuses on the *accessio* and *confusio* doctrines, traditionally sibling doctrines to the *specificatio* doctrine. The *accessio* doctrine includes three types of combinations: immovables and immovables, movables and movables, and movables and immovables. *Confusio* concerns only mixture of movables. The big picture of these doctrines is that there is little sign of convergence, except perhaps in *confusio*. From an economic standpoint, it is quite clear when two things should be considered combined (thus the *accessio* doctrine applies) rather than separable: If (the value of attached thing) > (the value of the two post-separation things combined) + (the cost of separation), the two things should remain combined. The next question is who should own it. The key concern behind my analysis is still to deter opportunistic or careless interference with other's property.

The Conclusion recapitulates the lessons of the comparative, empirical, and economic analyses and points out future directions that enable us to even better test the grand property theories and understand property legal systems around the word.