



Abstract rules for complex systems

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Accepted: 14 December 2020

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Abstract

This article addresses the question—What is the structure of rules required to undergird a complex dynamic system of actions such as the market economy? The idea of simplicity does not adequately highlight the particular characteristics that the rules must possess. Instead, this article explores the key requirement of abstractness. This is a multifaceted concept. It manifests itself in the abstract formulation of the antecedent clause in rules, and in ends-independence, decomposability, and generality. These requirements do not directly influence the size or scope of the state but they may indirectly do so by precluding certain forms of intervention.

Keywords Rules · Abstractness · Complexity · Stability · Predictability

JEL Classification K00 · K10 · K40 · P10 · P16

1 Introduction

Most analyses of the simplicity or complexity of rules take place within a largely static framework (e.g., Fon and Parisi 2007; Kaplow 1995). The optimal simplicity of a legal rule is defined relative to given data. The object is to balance public and private administrative costs, including error costs, against the value of a more finely tuned control of behavior.

In Richard Epstein's deservedly well-known *Simple Rules for a Complex World* (1995) there is both static analysis as well as concern for the robustness of rules in

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the context of economic change. Much of the time, the characteristics of rules that Epstein considers desirable are absorbed into the concept of simplicity or, even more often, into the idea of low costs of conformity to the rule.¹ Simple rules are sometimes abstract and sometimes they are just those that have low public and private administrative costs. At other times it is said that simplicity is not the only value and that some simple rules are undesirable.²

Usually Epstein's full analysis leads to rules that are coincident with the ones my own framework would also recommend. Nevertheless, I think that the strong emphasis on simplicity as low costs of conformity with the law can obscure the reasons *why and in what respect certain rules are "simple"* in the broad way that Epstein intends.³ Therefore, I propose to pursue the same fundamental issues he does more directly, both with respect to rules themselves and to the system that the rules are meant to support. My concern is with the properties of rules that are or should be characteristic of a dynamic, complex adaptive system and how those rules fit into the requirements of such a system.

In what follows I will focus on *abstraction, and not "simplicity,"* as the fundamental characteristic of rules for complex systems.⁴ Abstraction is a multifaceted concept.⁵ As I will use the term, it encompasses four different, but partially overlapping, aspects of rules. First, a rule may *abstract* from many of the particular characteristics of the persons or activities that come under its domain. This is the relatively narrow sense of abstraction. Second, rules may be *ends-independent* in the sense that they abstract from particular purposes of individuals (or the state). Third, rules may be *decomposable* (that is, they abstract) from either the environment or other rules within the same system. Fourth, rules may be *general* in their application, that is, they pass the test of consent under the veil of uncertainty where individuals conceptually abstract from their own positions and thus whether they will be winners or losers from particular applications of the rule. Therefore my concern will be with rules that are abstract in the narrow sense, decomposable, ends-independent, and general in application.

¹ "Unfortunately, by *defining* 'simplicity' in terms of the costs of compliance Epstein makes it difficult to assess which formal properties of rules might in fact produce low compliance costs" (Schauer 1997, 396).

² "The reason that as a matter of first principle simplicity is not the sole goal of any sensible legal system is that it seeks to minimize only one set of costs—the administrative ones—without regard to the impact that this action will have on the other key variable: the incentives to human action" (Epstein 1995, p. 33). This is correct as far as it goes. However, the statement does not acknowledge that simple rules also have more effective behavioral incentives because they are more understandable and hence predictable.

³ "...the terms 'simple' and 'complex' become too complicated and uncertain if they are thought to embody too wide an array of vices and virtues" (Driesen 2015, p. 183).

⁴ Simplicity will be discussed as an associated characteristic of abstractness.

⁵ For a discussion of abstraction from the perspective of morality, see Rizzo (2016).

2 What is the question?

My fundamental question can be succinctly stated as: *What are the primary characteristics of the legal rules that most effectively support a dynamic, complex, and adaptive system of economic actions?* In other words, I want to explore the structural characteristics of the rules of the game in which people carry on their individual purposes in a decentralized manner, especially through interpersonal exchange. This is considered the domain of “private law” that is, property, contracts and torts.

On the one hand, there is the order and nature of legal rules and, on the other, there is the order and nature of an on-going system of actions that the legal rules support. There are important relationships, including differences, between these two orders that it is necessary to explore.

Hayek (1973, pp. 98–9; 115–18) distinguished between the order of (common) law and the order of actions. The former gives rise to or permits the development of a highly complex order of actions. And yet the logical coherence of law is not the basis of the praxeological coherence of the system in which individuals act (Rizzo 1999).⁶ Consider a complete system of rules in which each rule is applied with flawless logical deduction from established premises by the judges. This does not result in effective coordination of plans if the individuals governed by the rules do not know them, do not understand them or cannot predict their application. Prediction by real people does not rest on the creation of a logically coherent theoretical system of law, even if such were possible.⁷

The emphasis in this article is on the predictability of law. This is not because it is the only requirement of a decentralized system of property and exchange. In a world of change, however, most of the other valuable features of law will depend on predictability as a necessary condition for their satisfaction. We shall also see that the structural characteristics of rules that enhance predictability are the sources of many important criteria of the “rule of law.”

⁶ “To the extent that a legal system can produce consistent expectations among those governed by the law as well as among those judges who are making initial decisions or taking appeals, it generates a kind of ‘coherence.’ Here we are not referring to [this] logical coherence of the law itself...but to the ‘coherence’ or compatibility of the plans of the relevant actors... [governed by] the legal system.” (Rizzo 1999, p. 502). The first is “logical coherence” and the second is “praxeological coherence”.

⁷ Henry Smith (2020, p. 151) comes to a similar conclusion from a somewhat different perspective: “Going all the way back to the German Historical School of the nineteenth century, jurists assumed that any system in the law had to be deductive...The notion of system from systems theory need not fall into this trap, because the connections between the parts of the system need not be deductive...” He cites F.A. Hayek and Lon Fuller as the two of the notable legal theorists before the late twentieth century to possess a systems theory of law.

3 Rules and their degree of abstraction⁸

Rules can be formulated as conditional (if–then) statements: “If x is a dog, then x is not allowed in the restaurant” and so forth (Schauer 1991, p. 23). The antecedent (“if”) specifies the domain of things or events covered by the consequent (“then”) which is often a prohibition. This means that rules are mappings from an input space into an output space. These mappings can differ by the degree to which the antecedent is abstract. For our purposes, *abstraction* refers to the creation a class of things or events on the basis of relatively few common characteristics while suppressing many individual characteristics. A rule is abstract if its antecedent is abstract. For example, a rule which states “If x is a dog, x is not allowed in the restaurant” is more abstract than “If x is a dog which is unruly, smelly and large, x is not allowed in the restaurant.” The antecedent describes the circumstances under which the prohibition applies.⁹

From these considerations we can make a generalization. *The degree of abstraction varies directly with the breadth of the partitions in the input space.* The wider the partitions—the more inclusive the class(es) mentioned in the input space—the greater the degree of abstraction. However, predictability is not a monotonic function of pure abstraction alone.

To abstract from many particulars might not seem in itself to create difficulties in knowing what goes into the abstracted class. However, an extremely abstract category gives us little guidance about what is in the category and what is out. Consider the case of a negligence rule (often called a “standard”). The decisionmaker will consider many particulars but their identity and weight will be unclear to others. Here the particulars are implicit. So a high degree of abstraction generates an indistinct partition, at least from the perspective of those governed by the rule.¹⁰

Regarding specificity, the more particulars there are in the input space of a rule the more confusion as to which class(es) a case goes into. Here the particulars are explicit. But some may be overlapping with excluded characteristics or hard to empirically ascertain. In addition, multiple partitions—each with a certain zone of vagueness—will, when taken together multiply the indistinctiveness of classes in probably a non-linear fashion. A high degree specificity—a low degree of abstraction—and indistinct partitions go together.¹¹

Let us clarify the distinction among these cases more fully by first examining a rule of intermediate abstraction: If X is a dog, then X is not allowed in supermarkets.¹² We can then imagine an input space which is divided into dogs and not-dogs

⁸ This section is an explication and application of the analysis in Whitman (2009).

⁹ This is the reason the antecedent is sometimes called the “factual predicate.” Schauer (1991, p. 23).

¹⁰ A negligence standard which has been concretized into specific and detailed rules is no longer “abstract” in the terminology used here.

¹¹ It is conceptually possible for an extremely specific rule to be completely determinate in application if the multiple categories are sharp in their boundaries, not overlapping, easily ascertained empirically, and with clear tradeoffs among the categories. This is an exceptional case.

¹² “We love your pets but the Department of Health says that no dogs are allowed in supermarkets”.

and an output space which is divided into allowed and not-allowed.¹³ The class “dog” does not discriminate between Spot and Fido. It also suppresses other characteristics of dogs—whether they are big, small, well-behaved, poorly-behaved, clean or dirty, beautiful or ugly and so forth. The input set abstracts from much about dogs but, on the other hand, restricts us to a fairly distinct class. This is intermediate abstraction.

Furthermore, since the output set is similarly partitioned into one, fairly narrow category, there are only two interrelating partitions.¹⁴ The input space is partitioned into dog/not dog and the output space into admit/not admit. This makes the rule also *simple*. All of the categories seem to be clear-cut and thus the rule is unambiguous and determinate in its implications for action. It is an intermediately abstract and simple rule.

However, disruption is always in the making. No doubt some will perceive an injustice here because service-dogs (such as seeing-eye dogs) will also be prohibited by the original simple rule. Thus there may be a tendency to further partition the input set and make an exception for service-dogs. “If X is a dog but not a service dog, X is not allowed in the supermarket.” And yet this may not be enough, the increasing popularity of “comfort animals” may further stress the rule. Will these be restricted to dogs or will other animals be permitted? Of course, the possibility of other animals entering the supermarket will cause people to revisit the initial focus on dogs. The upshot is that the intermediately abstract rule may get transformed in important ways. The input space may be further and further partitioned. At least some of the categories may no longer be sharp—what exactly is a comfort dog? “If X is an animal, but neither a service nor comfort pet, then X is not allowed in the supermarket.” It is also plausible that the output space could be altered from a simple allowed or not-allowed to allowed at certain (not-so-busy) times of the day or allowed into some entry space but not beyond. Thus a simple rule of intermediate abstraction may be transformed into a much more specific rule with more ambiguity because the distinctions are not bright-lined and subject to interpretation. The increased partitioning of the output space would also tend to increase the uncertainty of the impact on those governed by the rule.¹⁵

Imagine next an *extremely* specific rule in which the characteristics of dogs and other animals were broken down in fine detail, all arguably relevant to whether the animals are likely to cause various harms. The input space would be very narrowly partitioned. It is also likely to be complicated because some animals will be low-danger on some criteria and high on others. Add to that lack of sharp lines among the criteria and the very specific rule begins to look like the highly abstract rule in terms of its effects. Individuals will be uncertain about the law and its consequences in various circumstances. Practically speaking, the specific rule will also depend upon discretion. In the abstract case, discretion is a consequence of too little

¹³ For ease of exposition I suppress the penalty for violating the rule.

¹⁴ We assume a one-to-one relationship between the input and the output.

¹⁵ This would be the case if it is not clear to which input category X belongs and then it would not be clear in which output category it should be placed.

guidance. In the highly specific case, it is the consequence of too many guide posts that may not be clearly differentiated, may not have clear-cut weights to be applied in assessing the importance of each characteristic in the rule. Ordinary individuals will have difficulty sorting this out. Even if lawyers do not have as great a difficulty their services will add costs to the ascertainment of the law by those governed by it. Thus low-cost predictability is unlikely.

In the above discussion we have moved from intermediate abstraction to extreme specificity. Let's now move to the other side of the continuum. We can imagine a fairly abstract rule such as: "No animals *likely to cause disturbances or other inconveniences* are allowed in the supermarket." The input space contains some partitions but the characteristics of disturbance and inconvenience are far from clearly distinguishable from their absence. The essential characteristics are ambiguous or obscure in practice. Too much detail is abstracted from on the input side. Thus in many cases the rule will result in uncertainty among individuals in the system. We can move to still more abstraction until we reach a "rule" often characterized as a *standard*. An example might be: "If X is a thing or activity that unreasonably interferes with the normal activity of the supermarket then X is prohibited in the store." It abstracts *ex ante* from many particulars. Many things and activities are eligible to be included and many goings-on might be construed as unreasonable interference. Highly abstract rules are productive of uncertainty. They depend on the judges' or enforcers' discretion.

Before concluding this section it is necessary to relate abstraction to *simplicity*. As we suggested above, simplicity brings into consideration features of *both* the input and the output set. A simple rule is one with an intermediate degree of abstraction in the input set *and* an intermediate or low-level of partitioning in the output set. For example, imagine a law which stipulates that any motor vehicle going in excess of 60 miles per hour will be fined \$500. The input set focuses on one objective characteristic of motor vehicles and the output set focuses on only one clearly defined penalty rather than, say, a range of fines depending on the assessment of an enforcer or judge. If the law had a continuous range of fines or even of other penalties without clear guidance, then although the law is of intermediate abstraction it would not be simple. Simplicity is another characteristic of rules that enhances the predictability of their impact. However, without intermediate abstraction, narrow partitioning (e.g., small range of penalties) in the output space does not make for a predictable rule.

The first important conclusion we arrive at: *Only rules of intermediate abstraction satisfy the requirement of low-cost predictability.*¹⁶ Rules that *abstract* from too many characteristics in the input space as well as those that *specify* too many characteristics produce law that is uncertain. And yet this is not sufficient for predictability. The output space must also be limited as indicated above. Thus, two necessary conditions for predictability are intermediate abstraction in input space and a low

¹⁶ Low-cost predictability should not be confused with low compliance costs, although it is obviously one element of compliance costs.

number of clearly defined outcomes in the output space.¹⁷ Furthermore, if rules contain each of these characteristics, we can call them “simple.”¹⁸

The conclusion about predictability is reinforced when we consider the effects of changes in the external world on the stability of the law. By abstracting from individual differences in the classes of entities or activities mentioned in the input set, these can change but the rule can remain in place. For example, if the rule makes no mention of whether the dog is put on a leash, it does not matter if people begin doing so or stop doing so. If the law does not mention whether the dog is clean or not, it does not matter whether people begin bathing the dog more often or less often. The generality of a rule of intermediate abstraction makes it robust to external changes.

4 Completeness of the system of laws and predictability

Jeremy Bentham thought of himself as a great champion of the simplification of laws. He argued that one of the fundamental purposes of simplicity is to ensure that the law can be inexpensively known by those governed by it, thus generating clear and stable legal expectations. Accomplishing this requires that there be no gaps in the coverage of the law. Each type of behavior that could cause “mischief” should have an applicable rule. Let us examine what this would imply.

The two most important features are *completeness* and *individuation* (Postema 1986, pp. 428–9). Completeness seems to mean two things: first, the field of undesirable behavior is completely covered and second, each specific law comes with its exceptions as well as illustrations and guidance to the judge. Individuation means that each law is focused on one type of behavior (act or omission) so as not to be “overbulky” (Bentham 1843a, p. 239). Too much of a mass cannot be kept in mind by ordinary people.

There is a potential conflict here to which our previous analysis points. An ideal complete code (the “pannomion”¹⁹) would have rules of extreme specificity—a finely partitioned input space with classes of cases that might be difficult for those

¹⁷ I do not make the claim that these conditions are necessary *and sufficient* because they are not the only factors that affect the predictability of the law. At the very least, the rapidity of change in the law would have to be considered.

¹⁸ There is no uniquely correct definition of “simple” especially with respect to rules. The appropriate definition depends on the purposes of the analysis in which it is used. And yet it should not deviate too much from the ordinary dictionary definitions. One of several meanings can be found in The Oxford Learners’ Dictionary (2020): “consisting of only a few parts; not complicated in structure.” This is consistent with Kaplow (1995, p. 150) who defines the degree of “complexity” as “the number and difficulty of the distinctions rules make.” On the assumption that simple is the opposite polar case, I infer that a simple rule is for him one that makes only a few easy distinctions. Kaplow makes no reference to the output space. Fon and Parisi (2007, p. 148) write of “optimal specificity.” A very specific rule would have a lot of parts. Although they do not use the word simple, it is clear that a highly specific rule is not simple. Rules which are optimally specific are in most respects simple or, perhaps, optimally simple. They also do not consider the output space.

¹⁹ “By a pannomion, we understand the entire mass of the matter of law which in the country, or say, political state in question, has the force of law” (Bentham 1843a, p. 234).

governed by the rules to distinguish, especially when exceptions are figured into to the definition of the classes. As Gerald Postema says,

For if the code is to be completely precise, specific, and unambiguous, so that no two rules conflict and no justifiable exceptions are left out, the code will have to include a staggering number of specific rules which would be difficult to grasp and hard to keep straight (1986, p. 427).

So how does Bentham resolve this problem? He spent his life criticizing the complexity of the common law. He cannot consistently advocate a code which is highly complex, especially since one of his primary goals is to enhance the certainty of legal expectations. His solution to the problem is to apply the principle of utility in thoroughgoing manner. Therefore, the code must balance the fundamental (“original”) utility considerations with the utility arising from the certainty of expectations (“expectation utility”). The former encompass the incentives created to induce behavior in accordance with the purposes of the legislator. The latter involve the simplicity of the law from the perspective of those governed by it—their ability to understand the law and predict its application in the circumstances in which they find themselves.

Postema’s interpretation of Bentham’s solution is suggestive but somewhat confusing:

Simplicity, then, is *not* an ideal *competing with* completeness (in the broad sense) but is in fact partially *constitutive of* completeness (1986, p. 430).

We do not naturally think of completeness as encompassing simplicity. However, for Bentham *optimum* completeness of the law balances simplicity with coverage. Completeness and simplicity are each inputs into predictability. Although predictability is not the only purpose of a rule it is fundamental to appropriately incentivizing individuals to behave in accordance with the purposes of the rule.²⁰ Decreasing uncertainty also increases the effectiveness of the incentive structure. Therefore, increases in expectation utility and original utility *can* go hand-in-hand. If we return to Postema’s statement above we might revise it slightly to say: Simplicity is not an ideal competing with *optimal* completeness but is in fact partially constitutive of it. Unfortunately, however, Bentham does not address the idea of optimal completeness in any way that sheds light on the issues here.

If we turn our attention away from a *highly* abstract rule to one of intermediate abstraction there will fewer over and under inclusion errors and it is likely that *both* incentives and predictability will improve. On the other hand, if in an attempt to still further reduce these errors we move to a *highly* specific rule it is likely that both predictability and thus the incentive structure will deteriorate. At neither of the extremes of high abstraction or high specificity is there a tradeoff. Comparative statically, movement away from the extremes can improve both incentives and

²⁰ Insofar as people confused about how the rule applies to them, they can hardly be properly incentivized.

predictability. In these ranges the focus on predictability does all the work. There is no tradeoff.

The point Bentham seems to be making when he suggested a tradeoff between original and expectation utilities is that there is a tradeoff when the law changes due to changes in the legislator's purposes or in external conditions. Prior to that point expectations have been set, but the change disappoints these expectations. Individuals must adjust. Is it worth it? The principle of utility enters to balance the costs and benefits. Our analysis, however, permits us to say more. There is a tradeoff when rules are not extremely specific or extremely abstract. This is the range which I have called intermediate abstraction. How does all this play itself out? Where we land in the intermediate range, however, will depend on the tolerance for over and under inclusion error and the desired degree of predictability. For Bentham, all this must go into the utility calculator. If less abstraction in the input set does not disturb predictability very much, then the rule should become more specific in order to reduce these errors. Otherwise, not. A significant increase in unpredictability may offset the attempt to reduce error. What will come out of all these considerations "is not likely to be...a very large set of highly specific rules... [but] a smaller number of quite general rules broadly defined" (Postema 1986, p. 430). Accordingly, Bentham's logic moves us to less completeness and specificity than Bentham's own rhetoric suggests. In the first place, both predictability and control of behavior are improved when rules move from extreme specificity to more abstractness. Secondly, in the range of the tradeoff, specificity is constrained by the need to accommodate predictability.²¹

5 Simplicity: a deeper view

It is now time to explore more deeply a concept we have been dancing around, *simplicity*. In one sense, *all* rules are simplifications of their underlying rationales, justifications or purposes (Schauer 1991, p. 53). If we say that the purpose of the no-dogs rule is to avoid disruptions in the supermarket, the rule is a simplified attempt to achieve that end. We have already mentioned the reasons: not all dogs are disruptive and not only dogs can be disruptive pets. Law-makers may generalize empirically

²¹ Pursuing a different line of reasoning, many Legal Realists came to a similar position as Bentham. They believed in the desirability of a system of highly specific rules in part because such rules were more predictable in their application than abstract rules. Judges would make decisions based on close connection to the specific facts of a particular case. There would be many specific rules each tailored to a relatively small and unambiguous class of cases. Thus the closeness of the connection would leave less doubt about the decision than an abstract rule would. On our analysis, however, this is not at all obvious. The reason the Realists thought so is that they believed the judges would use "policy" considerations to ascertain the significance of the facts. If the policy objectives were known to analysts and potential litigants then, given the facts, a unique decision could be predicted. Thus the Realists thought that judges could circumvent the problem of too many classes, sometimes overlapping with unclear boundaries, by the imposition of a policy framework. However, the project failed because there are conflicting policy objectives and plural social values. On Legal Realism, see Fisher et al. (1993, pp. 164–171) and Leiter (2005).

and so the rule is based on a probabilistic factual premise—a simplification of reality. In general, the presence of dogs only raises the probability of disruption. But the rule is not only based on a simplified description of reality but on the purpose for which the rule is designed (or evolved): prevention of disruption. A simple rule is a simple way to attain a particular end. Simple is relative to that end. For legal rules there is no important substantive sense in which we can speak of simplicity, full stop. It needs a reference point.

We can imagine a rule of intermediate abstraction which is also simple but which is not conducive to a complex adaptive order. Consider a rule which mandates that all plants producing steel at a particular time in the past will now reduce their output by 10% at a date certain. The rule divides up the world (the input space) in a moderately abstract way—plants which have only the characteristic of having produced steel. The myriad of other characteristics is deemed irrelevant and hence abstracted from. In the output space is one relatively unambiguous command: steel production is to be reduced by 10%. Hence a simple rule of intermediate abstraction. The production rule is simple, given the purpose of the legislator. This may be to raise the price of steel in order to increase the profits of the steel producers. Most economists would say that this is not a rule that is conducive to a complex adaptive order because it distorts price signals, despite the certainty of its impact on those immediately governed by the rule. Simple rules do not necessarily have simple effects. What is missing is abstraction with respect to the ends sought. This is what Hayek calls *ends-independence*. I have more to say about this in the next section below.

There is another sense in which rules or, more precisely, systems of rules can be simple. They can be presented and organized in a more coherent way, using language that is not needlessly obscure and perhaps by giving examples. This was certainly part of Bentham's project. We can even separate this aspect of the ideal code from the role of the legislature in making the rules. Bentham advocated, at least at certain times, culling the sensible rules of common law into an organized "digest." This is similar to what Kocourek (1930, p. 155) called "juristic generalizations." This refers not to the content of the rules but to the organization or structure by which rules are made intelligible. Such very broad classifications, well-known to students of law, such as torts, contracts, quasi contracts, remedies are the first level of organization. Bentham provides more detailed categories in his complete code.²² Obviously, these factors have an impact on how well and inexpensively the law can be known to those governed by it. The better and less expensive, the more the system of rules is in Bentham's sense simple.

²² For example, he presents a "Table of the Division of Rights." The initial classifications are: *Sources* of rights, *Ends* served by rights, *Subject* over which they are exercised, *Extent* or number of people subject to them, *Person* whose interests concerns the rights, *Divisibility* among persons, and *Transmissibility*. And then there is a description of the "principal heads [headings]." These include: rights of property, rights over things, and rights over persons with further subcategories. (Bentham 1843b, p. 185)).

6 Ends-independence

Simple rules of intermediate abstraction, as well as coherence in the organization of rules, are also carriers of substance. To continue painting the picture we must attend to the end sought by a rule. As we have said, the term *abstract* can be used in different senses. So far I have used it primarily to refer to abstraction from details in the input set when referring to the persons, things or circumstances subject to a rule. For example, rules that encompass *all* dogs, drivers, pedestrians in *all* supermarkets, roads, streets are abstract (or general). They abstract from many particulars.

There is another important sense in which a rule can be abstract. This will be the case if its primary function is to facilitate numerous private purposes and many types of interpersonal exchange. It thus abstracts from the particular content of those purposes and interpersonal exchanges. The basic rules of contract law are a paradigmatic example (Epstein 1995, pp. 73–78). Classical contract law does not regulate the price at which transactions take place nor what is transacted. It even allows people to trade on superior knowledge of market conditions. It largely facilitates, not inhibits, except where private parties frustrate the ability of other parties to engage in mutually advantageous exchange (force, fraud). The basic “rules” are more along the lines of generalizations about the nitty gritty of contract law—perhaps better referred to as principles (but little rides on that term here). At the more detailed level the rules tend to be of intermediate abstraction in the input set. Therefore, the consequences of the rules are relatively predictable. But they are not merely predictable; they are facilitating and thus abstract in the sense we are calling *ends-independent* (Hayek 1976, p. 36).

Ends-independence is relative concept. Rules have this characteristic relative to other actual or conceptually possible rules. For example, take the familiar and simple rule: All cars must stop at the red light on city streets. It is a general, simple rule. Is it ends-independent? In one sense it is not. All drivers must perform a particular act at a particular time. Very exceptional situations aside, the rule is no respecter of any individual’s desire to speed up his journey for personal reasons. On the other hand, such a traffic rule doesn’t tell anyone what journeys to take, what to do when he arrives, and a wide range of other things. The rule restricts the attainment a few ends in the service of facilitating a great many other ends that private individuals have. In a sense, it is similar to contract law which constrains individuals to keep their promises for the sake of expanding the individual’s range of choice in many situations to come. Therefore, traffic laws are ends-independent.

Thus, rules of intermediate abstraction, even those with simple output sets, are not sufficient to facilitate and preserve a complex adaptive system of interaction and exchange. These rules are necessary but the system also requires that they be ends-independent. *Complex systems require simple rules of intermediate abstraction that are ends-independent.*

7 Stabilizing the system of rules

Before we can discuss the importance of decomposability and generality we must focus in greater detail on the properties of a complex adaptive system.²³ They are: the interrelation of the many variables that comprise the system, the emergence of novel and unpredictable properties from the combination of old ones, and the impossibility of detailed modelling and planning of the system.²⁴ Certainly a modern market economy is such a system (Mitchell 2009, p. 10). However, it has also been argued that the law is such a system (Ruhl and Katz 2018, p. 27). This is true, especially when we consider a system of common law generated rules. But I will look at law in a more limited way as a system in the service of private ends, and not as a substitute for it. This perspective requires us to pay attention to the ways in which a system of law stabilizes itself and creates a predictable environment for those governed by the law. Thus I shall primarily emphasize the features of law as a *stabilized* complex system facilitating a market economy as a dynamic, emergent complex system.²⁵

8 Law amid flux²⁶

One important property that stabilizes a system of law adapted to a complex economic order is *decomposability*.²⁷ The first aspect of decomposability is the ability of the system of rules to decouple itself from the environment. The second aspect is the ability of different parts of the system of rules to decouple from each other. In both cases decomposability is not an either/or property but one of *degrees*. An intermediate amount of decoupling is desirable. The argument here parallels the previous arguments for intermediate abstraction of input sets.

²³ The reader should be aware that the meaning of the word “complex” in the context of a system is different from its meaning with respect to a rule. In the former we are referring primarily to the *interrelation* between parts or variables and not simply the number of variables (Weaver 1948, p. 539.) In the latter a rule may be complex (depending on the particular author) if the number of parts, conditions, circumstances cited are many. In some cases, as with Epstein (1995) it is complex if the cost of compliance is high. Partly to avoid confusion, I thought it best to discuss rules in terms of abstraction rather than complexity.

²⁴ A complex system is one “in which large networks of components with no central control and simple rules of operation give rise to complex collective behavior, sophisticated information processing, and adaptation via learning or evolution.” Furthermore, it is “a system that exhibits nontrivial emergent and self-organizing behaviors” (Mitchell 2009, p. 13). This is essentially what Warren Weaver (1948, pp. 539–542) meant by “organized complexity”.

²⁵ In other words, I am ignoring for present purposes the co-evolution of the law itself with the economy.

²⁶ For an early attempt to deal with the issues of legal certainty in a world of change, see Rizzo (1980). I view this current article as fundamentally compatible with the earlier one.

²⁷ See Simon (1969, pp. 197–206) and Loasby (1991, pp. 46–54).

8.1 Decoupling from the environment

An extremely abstract rule (often called a standard or principle) like “no liability without fault” is quite decoupled from changes in the environment. Its abstraction permits many factors both old and novel to be considered. Technological change in accident-avoidance, for example, can be accommodated with its purview. Yet, in itself, the rule is too decoupled or abstract for expectations stability. Unless there are subsidiary rules of thumb indicating what specifically in *classes* of circumstances fault (negligence) consists in, predictability is jeopardized. In fact, courts do apply the negligence standard in a less abstract or free-wheeling way. Concepts of “ordinary prudence,” discrete or on–off notions of adequate care, local norms are some of the ways the law makes negligence a manageable “rule” (Smith 2011, p. 20).

Property law has classically been based on input classifications of intermediate abstraction. This is connected to the rather limited forms of property allowable (“*numerus clausus*”) in the common law system.²⁸ These limited forms must do a lot of work facilitating activity under a wide variety of detailed circumstances. For example, the mortgage form can be used regardless of the economic function of the property—whether it is a farm, a factory or a home. Furthermore, complex relationships can be structured by combining multiples of the standard forms (Smith 2020, pp. 153–154). The rules governing property relations are simplified by the standardization of the duties of outsiders across many kinds of property (Smith 2011, p. 7). Thus the basic rules take on the character of intermediate abstraction since they can ignore many particulars. Analytically, private nuisance law occupies a position between property and tort law. As such it should not come as a surprise that it is a mixture (some would say a “mess”) of intermediately and highly abstract rules. Some cases approximate the law of trespass. When the interference with the use and enjoyment of land is intentional and substantial, the plaintiff is entitled to an injunction without balancing the costs and benefits of the activity or reference to the plaintiff’s negligence. The issue is primarily whether a threshold of interference is reached (Epstein 1979). Aside from possible ambiguities in the determination of the threshold the rule abstracts from the uses to which the plaintiff puts his land or the defendant’s negligence. The factors considered by the law are few. Cases decided in this way embody rules of intermediate abstraction. On the other hand, there is another line of cases, consistent with the Second Restatement of Torts, which define the “unreasonableness of an intentional invasion” as one in which “the gravity of the harm outweighs the utility of the actor’s conduct...” (Restatement (Second) of Torts § 826 (1965)). The governing rules here are more abstract than in the former cases because appeal is made to a standard that *can* encompass a wide variety of situations without an explicit statement beforehand. The rule itself mentions no

²⁸ These include fees, life estates, easements, leases and mortgages, etc. The fact that there are more than one or two forms is a reflection of the intermediate level of abstraction in the existing classes. No one class can be so abstract as to cover all of the functions individuals want property to serve. See, generally, (Merrill and Smith 2000).

concrete particulars and so its implementation will create greater uncertainty than in the trespass-like cases.

Rules of intermediate abstraction are not entirely decoupled from changes in particulars over time. Not all change can be accommodated under existing rules or even under slight modifications of them. In these cases reference to the background purposes of the rules can provide a predictable transition to a new rule. Suddenly, in a particular community, more people begin to adopt monkeys as pets. May they enter the supermarket on a leash? If the underlying purpose of the existing rule is to prevent disturbances or possible unsanitary conditions and this is generally understood, then the change can happen without unpredictable impacts. What has happened here is an appeal to a higher level of abstraction in order to make a modification at a lower level of abstraction (Whitman 2009, p. 40).

David Hume (2000, 3.2.9.3) argued that exceptions to general rules should be resisted unless the exception itself can be stated as a general rule. The idea was to avoid special-interest exception-seeking that would effectively destroy the main general rule rather than simply modify to account for novel situations. By focusing on exceptions as lower-level but still abstract and general rules, the intermediate abstraction of the central rules is preserved. The exceptions to the original rule are in turn formulated to accommodate as much change or variation as possible within *their* domain. Thus the rule-like exceptions themselves get decoupled from many changes in the sub-environment.²⁹

8.2 Decoupling from Other Legal Rules³⁰

Another property that can stabilize a complex system is the decoupling of rules and their changes in one area of law from those in other areas. Here we shall see, however, that while decoupling is beneficial in one context, coupling, in the sense of extending, can be in another context.

Decoupling dominant rules from their rule-like exceptions is a way of preserving their intermediate abstraction while accommodating the exceptions. An important example is the treatment of equitable defenses to the enforcement of contracts (Smith 2018). In the modern era equity was transformed from broad discretion to rules of its own. The application of its rules is typically triggered by certain clear characteristics of the situation. On the other hand, if equity were an always-on, free-wheeling possibility of invalidating contracts made without fraud or duress, there would be considerable uncertainty. The standard rules of contract would be burdened by exceptions which, even if clear theoretically, would be unclear in terms of the specific circumstances of their application. Instead, the possibility that a contract

²⁹ Rule-like exceptions are also a way of systematically decoupling the exceptions from the main rule so that rule is not degraded. See the next section.

³⁰ Some theorists refer to this form of decoupling as “modularity.” For example, “In response to complexity, systems are often organized in a modular fashion: not every node can interact freely with any other. Instead, clusters of nodes interact intensely within the group (module) and more sparsely between groups. This allows a range of activities to take place without destabilizing and hard-to-understand ripple effects” (Smith 2019, p. 48). See also, e.g., Smith (2011).

might not be enforced may be limited, for example, to cases of “constructive fraud,” that is, where there are extremely one-sided terms or great inequality of bargaining power. Thus equity is generally no threat to legal predictability when the exceptions it generates arise in clear and infrequent circumstances. As such, it is a way of handling the possibility of over- and under-inclusion errors without lowering the abstraction level of the dominant rule.

The absence of decoupling, on the other hand, can be a source of confusion. In cases where there is established law in two areas attempts to develop or extend the rules of one into the other area can increase the level of uncertainty. For example, blurring the distinction between contract and tort can reduce legal determinacy (Schuck 1992; Henderson and Twerski 1987, pp. 279–80).³¹ Allowing individuals to sue for damages from a product failure when the product has passed a regulatory agency’s standards is, in effect, a *coupling* of two sets of rules.

However, extending legal conceptions from one area into another undeveloped area can reduce uncertainty through the use of legal fictions. Fictions can build a new rule or series of rules out of an old set of rules in a way that minimizes the damage done to expectation stability. In Roman law, for example, the law of obligations was extended to additional obligations that arose *quasi ex contractu*. Duties *as if* there were a contract became part of the existing system of obligations. If the concept of contract were not abstract it could not have been extended in this way. Suppose you are away from your property and your property is partially destroyed by a storm. A neighbor repairs your fence incurring expenses without any agreement or explicit contract. Nevertheless, the neighbor can recover these expenses from you in quasi-contract. But where is the contract? The assumption is that if you had known the facts, you *would* have approved and been willing to pay for this service (Borkowski and Du Plessis 2005, sec. 9.9.1). It is as if there had been a contract. We can easily move on to unjust enrichment from this point. Obviously, the owner of property would have been unjustly enriched if he were not obligated to pay for the repair. But the concept is more general. Suppose a person mistakenly transfers money or property to another thinking that he owed it as part of a debt (contract). The other person does not act in bad faith in receiving it. He is mistaken too. Nevertheless, the person to whom the transfer was made must return the money or property. (Borkowski and Du Plessis 2005, sec. 9.9.2). One could see why this is classified by Justinian as a quasi-contract. It can be construed as a mistake about a non-existent contractual obligation or a contractual obligation by mistake. If it is important to enforce contracts it is important to disallow mistaken contracts for much the same reason. The analogies can and were further extended.³² Ultimately,

³¹ “This consideration ...should counsel courts against extending tort principles into the realm governed largely by private contractual relations under the Uniform Commercial Code” (Schuck 1992, 49).

³² Thus in a contractual situation where a launderer loses a person’s clothes, pays to value of the clothes to the owner but later finds the clothes, the launderer may recover the payment. Although before the clothes were found the launderer owed the money, afterwards he no longer does. The payment can be recovered because it is not contractually owed (anymore). The link with contract is getting weaker but it is still there. This situation opens the door to broader considerations of fairness and unjust enrichment. See Borkowski and Du Plessis (2005).

the later analogies may bear little relation to the original one. However, the job is done—new rules are introduced, but in a way that encourages the perception of continuity. And from there a further continuity of future rules of restitution can proceed.

9 The generality principle

I use the term *generality* in the sense of Buchanan and Congleton (1998). Pre-eminently, this is an operational rather than a semantic criterion for rules. It matters less how a rule is explicitly stated—general terms, the semantics of equal application and so forth—than whether it is the interests of all individuals. The proof of the pudding is whether the rule can pass the test of consent behind the *veil of uncertainty*.

Buchanan and Congleton (1998, p. 6) describe the veil of uncertainty as a conceptual decisionmaking-condition under which “participants...are unable to predict their own positions or how differing rules will affect whatever positions they come to occupy” in the world in which the rule is applied. If all, or virtually all, individuals can rationally consent to such rules, then the rules satisfy the generality principle. In so doing there is reciprocity: I agree to be bound if you agree to be bound. The rule is in the general interest because it is in the individual interest, assuming mutual adherence. There is a coincidence between the individual and the general interest.

The veil of uncertainty test is a filter that tends to eliminate simple rules that may be abstract in a semantic sense but are destructive to an order of private purposes and exchanges. The generality principle, through the veil of uncertainty test, is a structural feature of rules that also has substantive consequences (Epstein 1995, pp. 58, 93, 100, 109). Among these consequences are limits on the number of exceptions to rules, real abstraction or generality in application (in contrast to mere semantic abstraction), and bias toward mutually advantageous arrangements. For example, a strong presumption that voluntary exchanges among individuals should be permitted is likely to achieve virtually unanimous consent behind the veil. As people look to the indefinite future but are not aware of their relative positions in the world to come, the disadvantageous of voluntary exchange will be dominated by the advantages. Consider in this regard the phenomenon of pecuniary externalities inherent in competition. A manufacturer who is being outcompeted by another manufacturer might look kindly on an exception (restriction) to voluntary exchange or some form of compensation for the pecuniary externality. Without the knowledge of relative positions and being confronted with a rule for the indefinite future, such exceptions or compensation are far less likely to command consent.

10 The scope of government

The abstraction, simplicity and decomposability of legal rules do not have clear implications for the scope of government. However, ends-independence and generality do, at least indirectly. Ends-independence prevents the state from favoring the goals of some private persons over others. Therefore, the political incentives to make exceptions to abstract rules are reduced. However, to a certain extent ends-*dependent* rules cannot be avoided altogether in a complex adaptive system. For example, when administrative solutions are the only feasible response to externality problems, environmental rules may violate the criterion of ends-independence. Externalities call for some form of collective action. On the other hand, the generality principle minimizes the extent to which these rules can favor one party or another. Factories will not be given unlimited pollution rights at the expense homeowners because the generality principle obscures relative positions. Therefore, an administrative rule that mandates a reduction in pollution can still be at least partly ends-independent. The interference with private ends is reduced.

Much the same is true of public goods. Certainly a complex order will need public goods such as physical infrastructure, national defense and so forth. To the extent that these cannot be provided privately, the administrative rules that constitute the mechanism of provision are not ends-independent. However, once again, the generality principle reduces the incidence of rules like these. In the first place, the veil test makes it far less likely that goods will be declared “public” which do not benefit each and all. This means that private goods which promote the ends of some rather than others will not sneak in under the rubric of public goods. Second, the taxation for such goods will be spread more evenly than if the identities of the taxpayers were known beforehand.

The generality principle thus serves a supplementary role in reducing the reach of government in those areas where ends-independence is not completely feasible. It brings a certain degree of abstraction to rules beyond those in the traditional common law areas of property, contract and tort.

11 Conclusions

My original question was: *What are the primary characteristics of the legal rules that most effectively support a dynamic, complex, and adaptive system of economic actions?* The most important characteristic is abstraction in the most general sense. And yet just as there can be too little abstraction, there can be too much by the standard of predictability.

Abstraction takes a number of partially overlapping and interacting forms. First, there is the *abstraction of antecedents* in the conditional formulation of rules. I have conceptualized this as a mapping of an input space with wide partitions to an output space of consequences. Abstraction of the antecedent can go too far for predictability. Therefore I have emphasized an intermediate degree of abstraction as “optimal.”

If, in addition, the partitioning of the output space is modest, that is, restricted to a few clear and specific consequences we say the rule is also *simple*.

Second, there is abstraction from the particular ends of particular persons. I have called this *ends-independence*. This fairly well represents the character of the classical common law areas of property, contract, and tort. It is not just a matter of being abstract with regard to the persons covered by a rule but the activities that they are required either to perform or avoid do not interfere with the general or overall pursuit of private ends.

Third, there is abstraction in the form of *decomposability* of the rules. This characteristic stabilizes the system of rules amid instability or change in the underlying system of actions. Changes in economic data or in forms of adjustment do not cause significant instability in the rules of the game. Furthermore, the rules ought to be decomposable from each other in the sense that the system avoids overlapping and possibly conflicting rules covering the same behavior. Together these properties are abstraction from the environment and abstraction from other rules.

Fourth, there is the *generality principle*. This subjects rules to a test of consent behind the veil. Conceptually, the rule-maker imagines that he is making a quasi-permanent rule. He is behind a veil of uncertainty: he does not know or abstracts from his relative position in the world to come. If virtually unanimous idealized consent can be obtained for such a rule, then it satisfies the generality principle. The function of this test is to filter out rules that may be abstract and simple but are nonetheless destructive to a complex adaptive system. A supplementary function is to reduce to interference with the pursuit of private ends when the ends-independence criterion cannot be met as in the cases of externalities and public goods when they must be handled administratively.

Therefore, the brief answer to our original question is this: Complex adaptive systems, like the market economy, need rules that are *abstract, simple, ends-independent, and conform to the generality principle*.

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