

Modeling “The Law” with the Hope of Defining It

Jenna Bednar*
University of Michigan
jbednar@umich.edu

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I will begin with two conceptions of the law: law as sanctions and law as focal points. In section 2 I introduce a model of the law. In section 3 I demonstrate that although the model is one of the law as sanction, it is consistent with a model of law as focal point. Finally, I note the indeterminacy of what we mean by the law, formally, despite our ability to model it.

1 Law: Coordinator or Sanction?

In order to model law, we must first define it. Actually, this essay will culminate in a contradiction to that statement, but it seems like a logical place to begin. Here I list four meanings often used. First, law may be a public, recorded act, such as a statute or a constitution. Or, second, one might argue that statutes and constitutions only acquire meaning as they are interpreted, and so a law is born and re-born in the judge’s hands. Third, it may be that law is how we expect one another to behave, when writing the public act; it is an empirical pattern, a behavioral norm. Finally, a fourth meaning: the law may be what constrains judges; it may be an evolved interpretation that lawyers learn in law school and generally obey throughout their careers; it is a presence that weighs heavily upon a judge’s decision. Although it isn’t generally stated this way, we can think of this fourth meaning as our expectations of judicial reactions. This essay will demonstrate that under

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Table 1: A Game of Pure Coordination

		Player 2	
		Left	Right
Player 1	Left	(1, 1)	(0, 0)
	Right	(0, 0)	(1, 1)

certain conditions some, perhaps even all, of these definitions are identical. But in most cases, the definitions are analytically distinct.

In addition to these four definitions of law, we need to consider law’s effect. One view of law is that it serves as a coordination device. Many social interactions require us to see eye-to-eye, to develop common understanding. Law serves as a language, a form of communicating shared meaning or intentions. Sometimes the most trivial of details, if uncoordinated, can sink major projects: JPL lost a Mars Orbiter in 1998 because Lockheed-Martin, handling flight operations, used English units to calculate course corrections as the Orbiter approached Mars, but the Orbiter, programmed by JPL in metric, over-responded and either burned up or went drifting into space. Some coordination problems can be life-threatening: It doesn’t particularly matter which side of the road we drive on, as long as everyone picks the same side, but efficient transportation, even our welfare, depends upon everyone sticking to the same side of the road. A law directs us to the right side in most of the world.

Table 1 shows the forces at work in a game of pure coordination played by two actors. Each wants to do what the other does, but, as modeled in this matrix, each player must select its action without knowing the other player’s choice. Both players are equally satisfied with a (Left, Left) play or (Right, Right); the problem in a game of coordination is knowing which one to select. Coordination failure generates outcomes on the undesirable off-diagonals. Many mechanisms can make one action stand out: for example, if (Right, Right) were worth two points apiece, rather than the (1, 1) pictured here, its greater value to each player would make it salient. Culture, customs, and shared histories are other selection devices that cannot be captured within this simple game.¹ Absent a natural heuristic, law can make

¹See Schelling 1960 for further discussion of focal points, and Hardin 1989 on the constitution as a

Table 2: A Game of Asymmetric Coordination

		Player 2	
		Left	Right
Player 1	Left	(2, 1)	(0, 0)
	Right	(0, 0)	(1, 2)

one set of actions focal.

Law embodies a common expectation; in doing so, it provides political order. Some laws may be necessary only in the initial stages of a society’s life. Once the community is established, a pattern of order develops and the coordinating force of the law is no longer needed. The behavior becomes internalized; deviations feel as unnatural as driving on the left side for an American.

People do not always agree, or have such indifference to outcomes as in Table 1. With diverse preferences, while people might most want to coordinate, some would rank alternatives differently. See Table 2. In this game, commonly called the Battle of the Sexes (Robin and Chris most want to be together, but Robin wants to hike while Chris really loves a matinee with popcorn), the payoffs reveal the underlying difference in preferences. In this circumstance, law coordinates actions, but it also determines a distribution of goods; it creates winners and, if not exactly losers, then at least those that don’t win as much.

In both variants of the coordination problem, we didn’t model the law, we modeled its need. In Tables 1 and 2, we see the problems that a law might solve. In pure coordination games, where the law does nothing other than select a focal point, it is the forceless text in the constitutional preamble: the phrase “an ever closer union” that itself carries no weight, but may serve as a guiding principle that influences the path of a developing union.

Conversely, a law may be inserted into the game structure by altering incentives. We now consider the second effect of law, that it motivates us to do what we might not otherwise have done. It is the Prisoner’s Dilemma to the law-as-focal-point’s coordination game; left

coordination device.

Table 3: A Standard Prisoner’s Dilemma Game

		Player 2	
		Cooperate	Defect
Player 1	Cooperate	(3, 3)	(-1, 5)
	Defect	(5, -1)	(0, 0)

to our own devices, we are stuck in a situation that is second-best for all. (See Table 3.) These circumstances translate into lost opportunities for individuals and for societies. Laws, and institutions enabled to enforce them, may serve as external devices that make deviations costly (or cooperation more rewarding). Law is an artificial mechanism implanted in societal relations. When law is effective, it improves a community.

Unlike first set of cases, where law was a coordination device, the need for these laws will not cease. These laws do not shine a bright light on one choice, expecting people to follow; they goad us to do what we prefer not to do by altering our incentives.

Both of these conceptual frameworks of law’s effects—as coordination device and as sanction—have a weakness. Consider the first. If law is merely an equilibrium selection mechanism, it cannot be of use in many of the situations where we intuitively expect to see the influence of law. In the matter of choosing a side of the road to drive on, sure, law-as-selection-device may be sufficient. But what about the temptation, when you’re in a rush, to blow through the stop sign at a four-way stop while three other cars obediently wait? Law must provide an incentive when none exists naturally.

On the other hand, law as sanction has a weakness as well. The Prisoner’s Dilemma lulls with its seductive simplicity: we believe that there is a standard of behavior called “cooperate” that is unambiguously distinguishable from “defect”. When actions are not so easily distinguishable, or when it is not clear where to draw the line between acceptable and intolerable, what can the law sanction?

The strengths and weaknesses of the two frames interlock perfectly. Where coordination devices fail to motivate, sanctions fill in the slack. Where sanctions cannot identify appro-

priate behavior, coordination selects it. In the next section, I propose a model of law as sanctions, mindful that it also selects the behavior it coerces.

And fret not; I haven't forgotten the four definitions of law introduced in the first paragraph. They take center stage in the third act.

2 A Model of Sanctions

Let's consider a case where the usefulness of the law increases as more abide by it, but that compliance is costly, so that each subject of the law has an incentive to disobey. Also, there is imperfect monitoring, so that what is observed may not perfectly represent true action. This condition includes contexts great and small, from a state's acceptance of federally regulated interstate commerce to stopping at a four-way stop.

Borrowing from economics, we can describe a subject as weighing the expected costs of non-compliance against the expected benefits; the subject complies at the degree of non-compliance where the marginal cost of non-compliance equals the marginal benefit of non-compliance.² It is a standard assumption that the marginal benefit of shirking decreases in the amount of shirking, represented accordingly in Figure 1 by a downward-sloping line, while marginal costs may remain fixed or increase. Here I have pictured them as increasing. If full compliance is fixed at the origin, then initial non-compliance, at $x_{initial}^*$, shows a sizable deviation from it.

To improve compliance, we can increase the cost of non-compliance, with a corresponding upward shift of the marginal cost curve, represented by the dotted line and labeled "New Marginal Cost". In theory, we can increase cost (and marginal cost) enough that marginal costs and marginal benefits are equal at full compliance. In this manner, we can sustain perfect conformity, with equilibrium behavior at x_{new}^* as labeled in Figure 1.

However, the functional form illustrated by this figure is hardly general, and in Bednar

²The law is not the exclusive influence on human behavior. Apart from natural urges, including a conscience, or bonds of love, that might, through moral force, cause a person to comport herself even better than moral requirements (altruism), even Holmes' "bad man" pays attention to more than consequences triggered by violating the law.

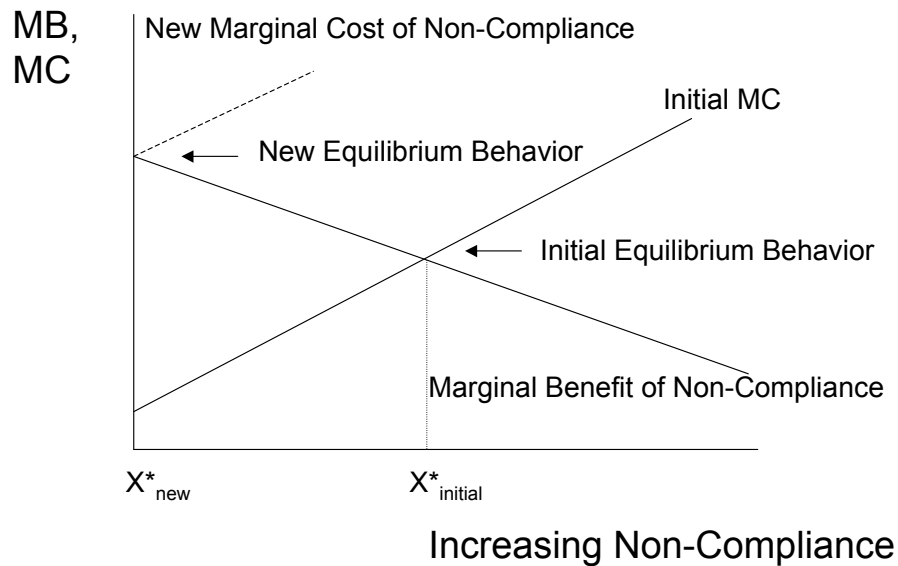


Figure 1: Institutionally Influenced Behavior with Linear Marginal Benefits and Costs

(forthcoming) I demonstrate how restrictive these assumptions are, and so how unlikely it is that full compliance may be achieved. With any non-linearity in the utility function—say, that a violator’s benefits become less attractive or that it becomes increasingly likely that a violator will be caught as it deviates more—full compliance cannot be sustained except by threat of a punishment that is grossly out of proportion to the crime; a punishment unlikely to be credible in a democratic society. Much more likely is partial compliance, as pictured in Figure 2.

What the judge does is set a threshold for tolerable behavior, labeled T in Figure 2, where $T > x^*$. When observed behavior (allowing for the observational error that comes

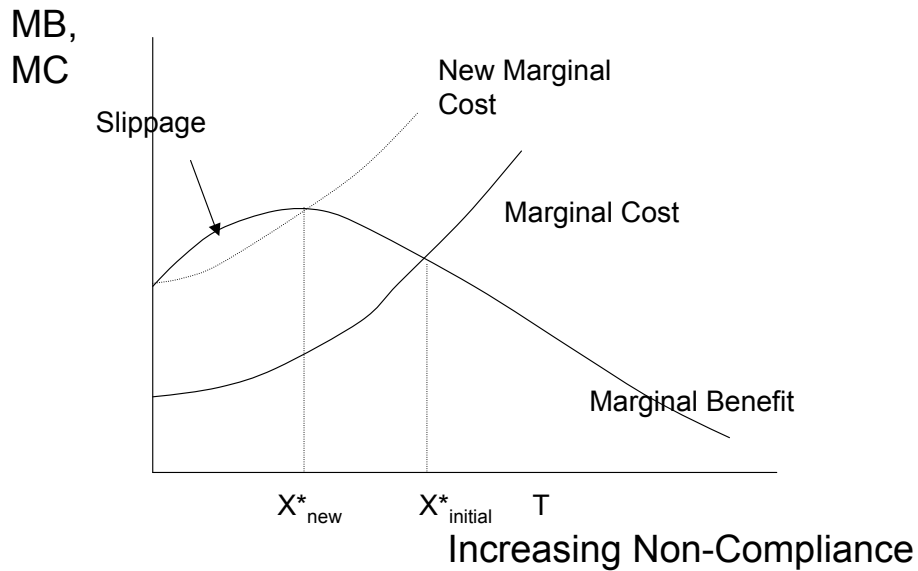


Figure 2: Institutionally Influenced Behavior with Concave Marginal Benefits and Convex Marginal Costs

from imperfect monitoring) exceeds this threshold, the judge rules against the defendant, and a penalty is levied. Increasing non-compliance increases the likelihood that the observed behavior will cross the threshold, *even when true behavior is on the tolerable side of the threshold*. Although increasing the cost of punishment improves compliance, the concavity of the marginal benefits (the curvature) and the convexity of the marginal costs render it practically impossible to induce full compliance.³

³In a forthcoming paper, I prove the conditions that generate this result.

3 Implication: Defining the Law

In this section, we return to our first paragraph, with a variety of definitions of law, to ask: What is the Law? Based upon Section 2, I find that law may be indeterminate in two ways: first, the threshold is judge-made, and therefore subject to judicial discretion (which cannot be determinate), and second, the conception of the “law” is ambiguous: is it the threshold, the full compliance, or the behavior induced?

Let’s consider the first indeterminacy: the setting of the threshold. In making a judgment, the court also defines what constitutes acceptable practice; it declares a threshold. Moving the threshold around will change the behavior induced, by making it more or less likely that degrees of non-compliance will be ruled unacceptable. In so doing, the judge implicitly selects among possible equilibria. With imperfect monitoring, the law-as-sanction frame and the law-as-coordination-device become equivalent.

But although the court has discretion to set the threshold, that discretion is limited. First, of course discretion is a function of information: the less uncertainty—the more perfect the information, either about the action, previous decisions, or the clarity of the law as originally expressed—the less discretion available to the current judge. But we don’t always discover a smoking gun; uncertainty plagues explanation and understanding, the realms of judicial decision-making, just as with legislative acts (even as the latter are based much more on predicting the appropriateness of policies to solve problems). Second, there is a sense that the law constrains judicial behavior. This use of the word law—admittedly an alternative, unmodeled here—considers the weight of precedent,⁴ which may fence in a judge’s discretionary range.

We can now turn to the second ambiguity in defining the law, aided visually by Figure 2. Is the law the origin on the “Increasing Non-compliance” axis, set at full compliance? Is it T , the threshold of acceptable behavior as declared by the court? Or is it x^* , the behavior induced by the court’s trigger and ensuing sanctions? I vote unambiguously against behavior.

⁴A dynamic model of law would consider its evolution as a path dependent process.

One might argue for it, arguing that mechanisms induce behavior, and so we design law, as a mechanism, in order to create desired behaviors. To the extent that law is the objective, a prescription on behavior, one might argue that the “law” is what we hope and expect people to do, and the threshold and punishments are just trappings to create it. However, I prefer a definition that views law as the instrument, rather than the outcome.

As to a selection between full compliance and the threshold, I am agnostic. Each definition has been used, and it seems pointless, even counterproductive, to limit ourselves to a single definition. Despite his elegant prose, Holmes gives us no counsel: “The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by the law.” One could squirrel out of choosing between them by reinterpreting Holmes as “The law is both the court’s declaration of what one ought to do and whether one has done so,” although the bad man really only cares about the latter.

Setting aside the task of selecting one definitive notion of the law, I want to comment on a set of implications that we should note:

1. If the law is what the court says it is, that is, it is the threshold, then the average citizen *overcomplies*; in equilibrium, $x^* < T$.
2. If the law is a focal device, or definition of what would constitute full compliance, then the typical citizen fails to comply fully: $x^* > 0$.

In writing this essay I find that I am drawn into a debate I know nothing about: the implications of law’s indeterminacy (Kutz 1994). However, in imposing the logical rigor of a formal model on our arguments, we must first examine which of these definitions we mean by law, for they are analytically distinct. The model offers a method for grounding that discussion.

References

- Bednar, Jenna. Forthcoming. “Is Full Compliance Possible? Conditions for Shirking with Imperfect Monitoring and Continuous Action Spaces.” *Journal of Theoretical Politics*.

Hardin, Russell. 1989. "Why a Constitution?" in Grofman & Wittman, eds., *The Federalist Papers and the New Institutionalism*. New York: Agathon Press.

Holmes, Oliver Wendell, Jr. 1897. "The Path of the Law." 10 *Harvard Law Review* 457.

Kutz, Christopher L. 1994. "Just Disagreement: Indeterminacy and Rationality in the Rule of Law." *Yale Law Journal* 103:997–1030.

Schelling, Thomas. 1960. *The Strategy of Conflict*. Cambridge, MA: Harvard University Press.