Law and Game Theory

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Abstract

This is the introduction and contents list for the forthcoming book, *Law and Game Theory*, in the series *Economic Approaches to Law* edited by Richard A. Posner and Francesco Parisi, Edward Elgar Publishing, forthcoming.

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1. Introduction

Game theory is an approach to analyzing situations that was been increasingly used in economics from 1970 to 2000 and has correspondingly been increasing used in law-and-economics. Economic theory since Adam Smith has been based on the idea that people's behavior responds to incentives, which generate unexpected results at the level of the market. Alfred Marshall introduced an elegant way to combine incentives and markets with supply and demand curves, which put the focus on the incentive of price, with costs and benefits of transactions in the background. The supply and demand diagram was, especially, the foundation of the Chicago School of economics which gave rise to the law-and-economics movement. The limitations of that diagram, however, are particular apparent when it is applied to the subject of law. A legal penalty is, to be sure, a price for breaking a law or a legal obligation, but two difficulties arise. First, asymmetric information, something hard to incorporate in supply and demand, is a common setting for law. Only the criminal knows he committed the crime; only the plaintiff knows precisely the damage caused by the tort. Second, legal actors often do not take the price as given. They bargain to reduce the price, or try to evade paying it, or must "buy the product" without knowing what price the court or regulator will make them pay.

These two problems appear in economic settings as well, and account for much of the success of game theory, which is peculiarly well-suited to deal

with them. Instead of the isolated, price-taking individual buyer and seller, or the anonymous marketplace, game theory begins with a group of individual players, each equipped with his own information, possible strategies, and payoff function. Incentives are still the center of attention, but now a player is conscious of his effect on what other players do and know.

Game theory is used in law as economics is typically: to simplify situations enough to show the key forces at work. This involves ruthlessly stripping away any features of the situation being analyzed that are unconnected to these key forces, This is well put by Judith Lachman in her 1994 review of A. Mitchell Polinsky's *An Introduction to Law and Economics,* where she compares the simplifying models of economics to maps of a single region that can look completely different depending on the purpose the map is intended to serve. (I have omitted the footnotes.)

> Fortunately for us – and despite Professor Polinsky's humble caveats to the contrary – his book comes equipped with everything. In particular, it comes equipped with an early chapter about the role of assumptions, and about the uses of abstraction in the process of economic inquiry. There Polinsky points out that "[e]conomists make assumptions for the obvious reason that the world, viewed economically, is too complicated to understand without some abstraction." He therefore suggests isolating one or two issues at a time "by making simplifying assumptions that eliminate the others," and later expanding the inquiry by adding various complications to the framework. In other words, the challenge of economic thinking is the proper use of abstraction; in determining how properly to use abstraction, one needs to take into account concerns about tractability, the realism of assumptions, the particular questions to be pursued, and the relationship of the assumptions to the goals of the inquiry. To use Polinsky's phrasing, "[t]he art of economics is picking assumptions that without

> inevitably causing those features to be unimportant ones.“
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> Because the process of economic abstraction is, by assumption, unfamiliar to the book's readers, I approach it by analogy to a more familiar concept, specifically, to abstraction in the form of maps. A map is an abstraction of the world, and its use requires a theory by which one can link the abstraction with the world. Before this linkage is established, however, one needs to know the questions the map should answer. Humbug. A map is a map is a map, you say? Then, by all means, help yourself to a soundscape map of Boston: “A composite view of the variety of city sounds perceived along a sequence of streets . . . [in which s]ymbols represent qualities of sounds . . ., for example, soft, intense, roaring, muffled, sharp, echoing, expansive.“ Or if that's not quite what you had in mind, how about an Eskimo Coastline Relief Carving (yes, you read that correctly), convenient for carrying on and around your ship? Or a color-coded map showing “The Percent of [the U.S] Population Unchurched . . . 1971“? And so on.
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> Somehow, these maps offer little help in getting from Madison to Chicago. Instead I want a road map, and a certain kind at that: I need to be given the details of the street plan for the cities at each end, but not such details for everywhere in between. I need to know about the roads, and seasonal temperature and precipitation indicators would be nice. What about cloud movements, wind direction and color-keyed info on vegetation? National and local parks, population centers, and Howard Johnson restaurants? The map darkens progressively with colors and symbols, and darkens still some more until . . . until I notice that even as I gave free rein to my desire to know more, I consigned myself to a map from which I could only know less.
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> This is the paradox of abstraction to which Polinsky succinctly referred: The skillful use of abstraction requires one to forego including some considerations that would indeed add information, so that the resulting abstraction will, in the end, tell us more.

So it is with models in game theory. Stripping a situation down to particular players, actions, and payoffs shows interactions between persons that would otherwise be obscured by reality's details.

Introductions such as this one are seldom read, but when they are, it is for two reasons. Newcomers to the field want guidance as to which of the articles contains the information they want, and which articles are best known in the field. Those more experienced already know which articles are most famous and what is in those articles, but wonder whether they should read the articles they have not seen before.

We start with four articles that are useful for thinking about the application of game theory to law generally. **"Playing Games with the Law"** (Ian Ayres, *Stanford Law Review,* 1990) is a review of my book, *Games and Information: An Introduction to Game Theory*, but a review that cleverly replaces the book as an introduction by using examples from law to illustrate game theory's basic models. The most important book on game theory and the law is the 1994 *Game Theory and the Law* by economics professor Robert Gertner and law professors Douglas Baird and Randal Picker. Rather than select a chapter from the book, I have chosen to include the review of it in dialog form, **"Review Discussion: Game Theory and the Law,"** organized by Kenneth Dau-Schmidt for *Law and Society Review* (including, also, Michael Alexeev, Jeffrey Stake,Robert Heidt and myself). A third article in this section is **"Symbols, Signals, and Social Norms in Politics and the Law"** (Eric Posner, *Journal of Legal Studies*, 1998), which gives general applications of signalling, an important subfield within game theory that has been particularly useful in studying social norms (as in Posner's book, *Law*

and Social Norms).

All three of those articles are enthusiastically in favor of the use of game theory, if with caveats about its potential for misuse. I've thought it useful to also include an overview that focuses on the misuse and complains about game theory's tendency to lead scholars into models too distant from the real world to be useful for analysis of any actual situation we might come across. For this, I've included **"Games Economists Play: A Noncooperative View"** (Franklin Fisher, *The RAND Journal of Economics*, 1989). Fisher is an economist known for his research in both econometrics and mathematical economics, but known also for his consulting work both for the defendant in the IBM and the plaintiff in the Microsoft antitrust cases. His complaint is that game theory has given little guidance for economic policy, and its users have therefore left antitrust law without the economic theory it really needs.

The next section, on **bargaining and procedure**, is about what might seem the most natural area for strategic behavior in the law. **"Economic Analysis of Legal Disputes and Their Resolution"** (Robert Cooter and Daniel Rubinfeld, *Journal of Economic Literature,* 1989) has long been a standard survey of the literature on suit and settlement, a literature that greatly expanded after publication of **"Strategic Behavior in Suit, Settlement, and Trial"** (Ivan Png, *The Bell Journal of Economics,* 1983). **"Settlement, Litigation, and the Allocation of Litigation Costs"** (Jennifer Reinganum and Louis Wilde, *The RAND Journal of Economics*,

1986), an alternative to Png's model, views settlement offers as signalling and gives a good explanation of how failed bluffing prevents some cases from settling before trial. This problem of why not all cases settle is the basis for one strand of the literature; another strand asks why plaintiffs who bring "nuisance suits" ever obtain settlements, since they would lose at trial. **"A New Theory Concerning the Credibilityand Success of Threats to Sue"** (Lucien Bebchuk, *Journal of Legal Studies,* 1996) represents that literature, and is particularly good as an illustration of the use of game theory.

The other two articles on bargaining and procedure are about labor law and discrimination, not suit and settlement. **"An Economic Theory of the Duty to Bargain"** (Keith Hylton, *Georgetown Law Journal,* 1994) uses game theory to analyze the curious requirement that union and employer bargain with each other in good faith, even though there is no requirement that either side make an acceptable offer to the other. **"Fair Driving: Gender and Race Discrimination in Retail Car Negotiations"** (Ian Ayres, *Harvard Law Review,* 1991) is an example of empirical game theory. Ayres gave a group of testers of different races and sexes a script with a bargaining strategy they were to follow in trying to buy a car. The results give an interesting picture of how professional bargainers (the salesmen) use their prior expectations to choose their responses to a given strategy.

Contract law is another natural area to which to apply game theory, since it involves two parties choosing actions in anticipation of how each

other will respond. **"The Strategic Structure of Offer and Acceptance: Game Theory and the Law of Contract Formation"** (Avery Katz, *Michigan Law Review,* 1990) applies the same sort of analysis used in the literature on suit and settlement to the question of how the law should treat contract formation. Even better known is **"Strategic Contractual Inefficiency and the Optimal Choice of Legal Rules"** (Ian Ayres and Robert Gertner, *Yale Law Journal,* 1992), which suggests that the government impose legal default rules that are purposely inefficient so as to induce the contracting parties to fully specify what they desire in contracts. Game theory is useful in explaining why parties make incomplete contracts in the first place, when drafting extra terms has relatively low cost. My own **"Explaining Incomplete Contracts as the Result of Contract-Reading Costs"** (Eric Rasmusen, *The BE Press:Advances in Economic Analysis and Policy,* 2001) is one example of that literature, one which not only satisfies this editor's sense of what is important but gives notice of the entry of purely electronic journals into the scholarly world. Finally, **"Legal Rules in Repeated Deals: Banking in the Shadow of Defection in Japan"** (J. Mark Ramseyer, *The Journal of Legal Studies,* 1991) applies the theory of repeated games (in simple form) to contracts in the particular context of Japanese banking.

Litigation and contracts are the areas which are perhaps best suited to game theory since they both involve two players who know each other and

know that their actions have intertwined effects, but I have included four articles on other areas of law, because the method of game theory can be applied even when one player is simply responding to the incentives created by a legal rule. The classic article on tort law, **"Toward an Economic Theory of Liability"** (John Prather Brown, *The Journal of Legal Studies,* 1973), precedes the conscious use of game theory in legal research, but it follows exactly the same method: establish payoff functions for various players and see what actions they will take to maximize their payoffs. There is by now a large literature on torts. **"Decoupling Liability: Optimal Incentives for Care and Litigation"** (A. Mitchell Polinsky and Yeon-Koo Che, *The RAND Journal of Economics,* 1991) is an example, chosen because it shows how carefully disentangling different incentives through the use of game theory can lead to surprising and understandable results.

The other two articles in this section are about public law. An early example is **"The Tax Compliance Game: Toward an Interactive Theory of Law Enforcement"** (Michael Graetz; Jennifer Reinganum and Louis Wilde, *Journal of Law, Economics & Organization,* 1986). This uses what even in the theoretical economics literature is known as an auditing model to look at how taxpayers respond to tax collectors and vice versa. Tax enforcement is just one area of public enforcement of law. **"The Economic Theory of Public Enforcement of Law"** (A. Mitchell Polinsky & Steven Shavell, *Journal of Economic Literature*, 2000) surveys public enforcement

generally, including, especially, criminal law.

The last section of this volume consists of three articles about the behavior of courts. The first article, **"The Selection of Disputes for Litigation"** (George Priest andBenjamin Klein, *The Journal of Legal Studies,* 1984), is famous for destroying the common-sense– but false– idea that if defendants win most of the cases in a court, that court is pro-defendant. This is false because what may be happening is that the court is so pro-plaintiff that only the defendants with extraordinarily strong evidence on their side bring their suits to trial, or because the majority of cases filed settle in favor of the plaintiff but the few that reach trial are a special set which happens to include mostly cases that the defendant will win. That article is about how litigants respond to court behavior. **"A Rational Choice Theory of Supreme Court Statutory Decisions with Applications to the "State Farm" and "Grove City Cases" "** (Rafael Gely and Pablo Spiller, *The Journal of Law, Economics, and Organization,* 1990) is about how court and legislature interact. Each can replace the rules set by the other at some cost, but a court might, for example, carefully change a legislative rule just enough that it is not worthwhile for the legislature to change the statute to defeat the court's action. Finally, **"Stability and Reliability in Judicial Decisions"** (Frank Easterbrook, *Cornell Law Review,* 1988) is about strategic interactions within a multi-member court, and the potential effects of vote "cycling".

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The List of Readings

640 pages, 21 articles. We could drop the Katz article and save 81 pages.

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