

## **A Behavioral Approach to Law and Economics**

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1 Economic analysis of law usually proceeds under the assumptions of neoclassical economics. But empirical evidence gives much reason to doubt these assumptions; people exhibit bounded rationality, bounded self-interest, and bounded willpower. This article offers a broad vision of how law and economics analysis may be improved by increased attention to insights about actual human behavior. It considers specific topics in the economic analysis of law and proposes new models and approaches for addressing these topics. The analysis of the article is organized into three categories: positive, prescriptive, and normative. Positive analysis of law concerns how agents behave in response to legal rules and how legal rules are shaped. Prescriptive analysis concerns what rules should be adopted to advance specified ends. Normative analysis attempts to assess more broadly the ends of the legal system: Should the system always respect people's choices? By drawing attention to cognitive and motivational problems of both citizens and government, behavioral law and economics offers answers distinct from those offered by the standard analysis.

2 Introduction

3 Objections to the rational actor model in law and economics are almost as old as the field itself. Early skeptics about the economic analysis of law were quick to marshal arguments from psychology and other social sciences to undermine its claims.<sup>1</sup> But in law, challenges to the rational actor assumption by those who sympathize with the basic objectives of economic analysis have been much less common. The absence of sustained and comprehensive economic analysis of legal rules from a perspective informed by insights about actual human behavior makes for a significant contrast with many other fields of economics, where such "behavioral" analysis has become relatively common.<sup>2</sup> This is especially odd since law is a domain where behavioral analysis would appear to be particularly promising in light of the fact that nonmarket behavior is frequently involved.

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<sup>1</sup> See, e.g., Mark Kelman, Consumption Theory, Production Theory, and Ideology in the Coase Theorem, 52 S. Cal. L. Rev. 669 (1979); Duncan Kennedy, Cost-Benefit Analysis of Entitlement Problems: A Critique, 33 Stan. L. Rev. 387 (1981); Arthur Allen Leff, Economic Analysis of Law: Some Realism About Nominalism, 60 Va. L. Rev. 451 (1974).

<sup>2</sup> See, e.g., volume 112, issue 2 of the Quarterly Journal of Economics, which contains 11 articles related to behavioral economics.

- 4 Our goal in this article is to advance an approach to the economic analysis of law that is informed by a more accurate conception of choice, one that reflects a better understanding of human behavior and its wellsprings. We build on and attempt to generalize earlier work in law outlining behavioral findings by taking the two logical next steps: proposing a systematic framework for a behavioral approach to economic analysis of law, and using behavioral insights to develop specific models and approaches addressing topics of abiding interest in law and economics.<sup>3</sup> The analysis of these specific topics is preliminary and often in the nature of a proposal for a research agenda; we touch on a wide range of issues in an effort to show the potential uses of behavioral insights. The unifying idea in our analysis is that behavioral economics allows us to model and predict behavior relevant to law with the tools of traditional economic analysis, but with more accurate assumptions about human behavior, and more accurate predictions and prescriptions about law. Certainly a great deal of work would be necessary to justify a final evaluation of most of the topics pursued here; there is fertile ground for future research, both theoretical and empirical, and one of our principal goals is to suggest the directions in which that research might go.
- 5 We suggest that an approach based on behavioral economics will help with the three functions of any proposed approach to law: positive, prescriptive, and normative.<sup>4</sup> The positive task, perhaps most central to economic analysis of law and our principal emphasis here, is to explain both the effects and content of law. How will law affect human behavior? What will individuals' likely response to changes in the rules be? Why does law take the form that it does? A superior understanding of human behavior will improve answers to such questions.
- 6 The prescriptive task is to see how law might be used to achieve specified ends, such as deterring socially undesirable behavior. Much of conventional economic analysis is concerned with this sort of question. Explicit consideration of behavioral factors can improve the prescriptions offered by

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<sup>3</sup> The existing legal literature includes several articles that generally catalogue behavioral findings and suggest legal issues to which these findings might be relevant. See Ward Edwards & Detlof von Winterfeldt, *Cognitive Illusions and Their Implications for the Law*, [59 S. Cal. L. Rev. 225 \(1986\)](#); Melvin Aron Eisenberg, *The Limits of Cognition and the Limits of Contract*, [47 Stan. L. Rev. 211 \(1995\)](#); Robert C. Ellickson, *Bringing Culture and Human Frailty to Rational Actors: A Critique of Classical Law and Economics*, [65 Chi.-Kent L. Rev. 23 \(1989\)](#); Cass R. Sunstein, *Behavioral Analysis of Law*, [64 U. Chi. L. Rev. 1175 \(1997\)](#). The existing literature also includes a number of articles that use behavioral insights to analyze specific topics in the economic analysis of law - primarily the Coase theorem and behavior during bargaining. These articles are relevant to a few of the issues we discuss below, and we will draw on them in analyzing those issues.

<sup>4</sup> For a similar distinction between positive, prescriptive, and normative analysis, see David E. Bell, Howard Raiffa & Amos Tversky, *Descriptive, Normative, and Prescriptive Interactions in Decision Making*, in *Decision Making 9* (David E. Bell, Howard Raiffa & Amos Tversky eds., 1988); Sunstein, *supra* note 3.

the analyst. For instance, instead of focusing only on the actual probability of detecting criminal behavior in considering whether offenders will be deterred, the analyst might also want to consider the perceived probability of detection and how it might differ in systematic and predictable ways from the actual probability.

- 7 The normative task is to assess more broadly the ends of the legal system. In conventional economic analysis, normative analysis is no different from prescriptive analysis, since the goal of the legal system is to maximize "social welfare," usually measured by people's revealed preferences, and prescriptive (in our sense of the term) analysis also focuses, for the conventional economist, on how to maximize social welfare. But from the perspective of behavioral economics, the ends of the legal system are more complex. This is so because people's revealed preferences are a less certain ground on which to build; obviously issues of paternalism become central here.
- 8 Each of these three strands of our project is deeply constructive. Behavioral economics is a form of economics, and our goal is to strengthen the predictive and analytic power of law and economics, not to undermine it. Behavioral economics does not suggest that behavior is random or impossible to predict; rather it suggests, with economics, that behavior is systematic and can be modeled. We attempt to sketch several such models here.
- 9 Part I below offers a general framework and provides an overview of the arguments for enriching the traditional economic framework. We see this enrichment as similar in spirit to the increased emphasis on asymmetric information in mainstream economic analysis in recent decades. Just as people often have imperfect information, which has predictable consequences for behavior, the departures from the standard conception of the economic agent also alter behavior in predictable ways....
- 10 I. Foundations: What Is "Behavioral Law and Economics"?
- 11 In order to identify, in a general way, the defining features of behavioral law and economics, it is useful first to understand the defining features of law and economics. As we understand it, this approach to the law posits that legal rules are best analyzed and understood in light of standard economic principles. Gary Becker offers a typical account of those principles: "All human behavior can be viewed as involving participants who [1] maximize their utility [2] from a stable set of preferences and [3] accumulate an

optimal amount of information and other inputs in a variety of markets."<sup>5</sup> The task of law and economics is to determine the implications of such rational maximizing behavior in and out of markets, and its legal implications for markets and other institutions. Although some of Becker's particular applications of the economic approach might be thought of as contentious, that general approach underlies a wide range of work in the economic analysis of law.<sup>6</sup>

12 What then is the task of behavioral law and economics? How does it differ from standard law and economics? These are the questions we address below.

13 A. Homo Economicus and Real People

14 The task of behavioral law and economics, simply stated, is to explore the implications of actual (not hypothesized) human behavior for the law. How do "real people" differ from homo economicus? We will describe the differences by stressing three important "bounds" on human behavior, bounds that draw into question the central ideas of utility maximization, stable preferences, rational expectations, and optimal processing of information.<sup>7</sup> People can be said to display bounded rationality, bounded willpower, and bounded self-interest.

15 All three bounds are well documented in the literature of other social sciences, but they are relatively unexplored in economics (although, as we noted at the outset, this has begun to change). Each of these bounds represents a significant way in which most people depart from the standard economic model. While there are instances in which more than one bound comes into play, at this stage we think it is best to conceive of them as separate modeling problems. Nonetheless, each of the three bounds points to systematic (rather than random or arbitrary) departures from conventional economic models, and thus each of the three bears on generating sound predictions and prescriptions for law. They also provide the foundations for new and sometimes quite formal models of behavior.

16 1. Bounded rationality.

17 Bounded rationality, an idea first introduced by Herbert Simon, refers to the

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<sup>5</sup> Gary S. Becker, *The Economic Approach to Human Behavior* 14 (1976).

<sup>6</sup> See, e.g., A. Mitchell Polinsky, *An Introduction to Law and Economics* 10 (2d ed. 1989); Richard A. Posner, *Economic Analysis of Law* 3-4 (5th ed. 1998).

<sup>7</sup> For a further elaboration of this view, see Richard H. Thaler, *Doing Economics Without Homo Economicus*, in *Foundations of Research in Economics: How Do Economists Do Economics?* 227, 230-35 (Steven G. Medema & Warren J. Samuels eds., 1996).

obvious fact that human cognitive abilities are not infinite.<sup>8</sup> We have limited computational skills and seriously flawed memories. People can respond sensibly to these failings; thus it might be said that people sometimes respond rationally to their own cognitive limitations, minimizing the sum of decision costs and error costs. To deal with limited memories we make lists. To deal with limited brain power and time we use mental shortcuts and rules of thumb. But even with these remedies, and in some cases because of these remedies, human behavior differs in systematic ways from that predicted by the standard economic model of unbounded rationality. Even when the use of mental shortcuts is rational, it can produce predictable mistakes. The departures from the standard model can be divided into two categories: judgment and decisionmaking. Actual judgments show systematic departures from models of unbiased forecasts, and actual decisions often violate the axioms of expected utility theory.

- 18 A major source of differences between actual judgments and unbiased forecasts is the use of rules of thumb. As stressed in the pathbreaking work of Daniel Kahneman and Amos Tversky, rules of thumb such as the availability heuristic - in which the frequency of some event is estimated by judging how easy it is to recall other instances of this type (how "available" such instances are) - lead us to erroneous conclusions. People tend to conclude, for example, that the probability of an event (such as a car accident) is greater if they have recently witnessed an occurrence of that event than if they have not.<sup>9</sup> What is especially important in the work of Kahneman and Tversky is that it shows that shortcuts and rules of thumb are predictable. While the heuristics are useful on average (which explains how they become adopted), they lead to errors in particular circumstances. This means that someone using such a rule of thumb may be behaving rationally in the sense of economizing on thinking time, but such a person will nonetheless make forecasts that are different from those that emerge from the standard rational-choice model.<sup>10</sup>
- 19 Just as unbiased forecasting is not a good description of actual human behavior, expected utility theory is not a good description of actual decisionmaking. While the axioms of expected utility theory characterize rational choice, actual choices diverge in important ways from this model, as has been known since the early experiments by Allais and Ellsberg.<sup>11</sup>

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<sup>8</sup> Herbert A. Simon, A Behavioral Model of Rational Choice, 69 Q.J. Econ. 99 (1955).

<sup>9</sup> Amos Tversky & Daniel Kahneman, Judgment Under Uncertainty: Heuristics and Biases, in Judgment Under Uncertainty 3, 11 (Daniel Kahneman, Paul Slovic & Amos Tversky eds., 1982).

<sup>10</sup> For further discussion, see the recent survey of results in John Conlisk, Why Bounded Rationality?, 34 J. Econ. Literature 669, 671, 682-83 (1996).

<sup>11</sup> See Colin Camerer, Individual Decision Making, in Handbook of Experimental Economics 587, 619-20, 622-24 (John H. Kagel & Alvin E. Roth eds., 1995) (describing the Allais paradox); Daniel Ellsberg, Risk,

There has been an explosion of research in recent years trying to develop better formal models of actual decisionmaking. The model offered by Kahneman and Tversky, called prospect theory, seems to do a good job of explaining many features of observed behavior, and so we draw on that model ... here.<sup>12</sup>

- 20 We emphasize that bounded rationality is entirely consistent with modeling behavior and generating predictions based on a model, in line with the methodology of conventional economics. As Kenneth Arrow has explained, "There is no general principle that prevents the creation of an economic theory based on other hypotheses than that of rationality... Any coherent theory of reactions to the stimuli appropriate in an economic context ... could in principle lead to a theory of the economy."<sup>13</sup> Arrow's example here is habit formation; that behavior, he says, can be incorporated into a theory by supposing that people choose goods with an eye towards minimizing changes in their consumption.
- 21 Though there is an optimization in this theory, it is different from utility maximization; for example, if prices and income return to their initial levels after several alterations, the final bundle [of goods] purchased will not be the same as the initial [bundle]. This theory would strike many lay observers as plausible, yet it is not rational as economists have used that term.<sup>14</sup>
- 22 2. Bounded willpower.
- 23 In addition to bounded rationality, people often display bounded willpower. This term refers to the fact that human beings often take actions that they know to be in conflict with their own long-term interests. Most smokers say they would prefer not to smoke, and many pay money to join a program or obtain a drug that will help them quit. As with bounded rationality, many people recognize that they have bounded willpower and take steps to mitigate its effects. They join a pension plan or "Christmas Club" (a special savings arrangement under which funds can be withdrawn only around the holidays) to prevent undersaving, and they don't keep tempting desserts

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Ambiguity, and the Savage Axioms, 75 Q.J. Econ. 643 (1961).

<sup>12</sup> Daniel Kahneman & Amos Tversky, Prospect Theory: An Analysis of Decision Under Risk, 47 *Econometrica* 263 (1979). For a survey of empirical tests of this and other models, see Camerer, *supra* note 11, at 626-43. John D. Hey & Chris Orme, Investigating Generalizations of Expected Utility Theory Using Experimental Data, 62 *Econometrica* 1291 (1994), conclude that expected utility theory performs fairly well, but they do not consider prospect theory as an alternative. An alternative to prospect theory for modifying expected utility theory is offered by Itzhak Gilboa & David Schmeidler, Case-Based Decision Theory, 110 Q.J. Econ. 605 (1995).

<sup>13</sup> Kenneth J. Arrow, Rationality of Self and Others in an Economic System, in *Rational Choice: The Contrast Between Economics and Psychology* 201, 202 (Robin M. Hogarth & Melvin W. Reder eds., 1987).

<sup>14</sup> *Id.*

around the house when trying to diet. In some cases they may vote for or support governmental policies, such as social security, to eliminate any temptation to succumb to the desire for immediate rewards.<sup>15</sup> Thus, the demand for and supply of law may reflect people's understanding of their own (or others') bounded willpower; consider "cooling off" periods for certain sales and programs that facilitate or even require saving.

24 3. Bounded self-interest.

25 Finally, we use the term bounded self-interest to refer to an important fact about the utility function of most people: They care, or act as if they care, about others, even strangers, in some circumstances. (Thus, we are not questioning here the idea of utility maximization, but rather the common assumptions about what that entails.) Our notion is distinct from simple altruism, which conventional economics has emphasized in areas such as bequest decisions.<sup>16</sup> Self-interest is bounded in a much broader range of settings than conventional economics assumes, and the bound operates in ways different from what the conventional understanding suggests. In many market and bargaining settings (as opposed to nonmarket settings such as bequest decisions), people care about being treated fairly and want to treat others fairly if those others are themselves behaving fairly. As a result of these concerns, the agents in a behavioral economic model are both nicer and (when they are not treated fairly) more spiteful than the agents postulated by neoclassical theory. Formal models have been used to show how people deal with both fairness and unfairness; we will draw on those models here.

26 4. Applications.

27 The goal of this article is to show how the incorporation of these understandings of human behavior bears on the actual operation and possible improvement of the legal system. The appendix summarizes some key features of each of the three bounds on human behavior just described. It also indicates the law and economics issues we analyze under each category.

28 When is each bound likely to come into play? Any general statement will necessarily be incomplete, but some broad generalizations can be offered. First, bounded rationality as it relates to judgment behavior will come into play whenever actors in the legal system are called upon to assess the

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<sup>15</sup> See Deborah M. Weiss, Paternalistic Pension Policy: Psychological Evidence and Economic Theory, [58 U. Chi. L. Rev. 1275 \(1991\)](#).

<sup>16</sup> See B. Douglas Bernheim, How Strong Are Bequest Motives? Evidence Based on Estimates of the Demand for Life Insurance and Annuities, 99 J. Pol. Econ. 899, 899-900 (1991).

probability of an uncertain event. We discuss many examples below, including environmental legislation ..., negligence determinations ..., and risk assessments .... Second, bounded rationality as it relates to decisionmaking behavior will come into play whenever actors are valuing outcomes; a prominent example here is loss aversion and its corollary, the endowment effect, which we discuss in connection with bargaining behavior ..., mandatory contract terms ..., prior restraints on speech ..., and risk assessments .... Bounded willpower is most relevant when decisions have consequences over time; our example is criminal behavior ..., where the benefits are generally immediate and the costs deferred. Finally, bounded self-interest (as we use the term) is relevant primarily in situations in which one party has deviated substantially from the usual or ordinary conduct under the circumstances; in such circumstances the other party will often be willing to incur financial costs to punish the "unfair" behavior. Our applications here include bargaining behavior ... and laws banning market transactions ...

29 The three bounds we describe do not (at least as we characterize them here) constitute a full description of human behavior in all its complexity. Although we will have more to say about parsimony below, we will say for now that our goal is to sketch out an approach spare enough to generate predictions across a range of contexts, but not so spare that its predictions about behavior are often incorrect (as we will suggest is the case with conventional law and economics in some contexts). Many interesting features of behavior discussed by psychologists but not emphasized by our framework may also play a role in explaining specific forms of behavior relevant to law.<sup>17</sup> And it can be illuminating to attend in some detail to the role of social norms in various contexts<sup>18</sup> and to the place of shame, pride, and status,<sup>19</sup> especially insofar as an understanding of these variables helps give content to people's utility functions in ways that bear on the uses of law. Our principal purpose here, however, is to provide predictions, rather than to give full descriptions of individual motivations and self-understandings, and we will refer to these variables only occasionally and in passing. For similar reasons, we do not emphasize behavioral patterns that depart from standard economic assumptions but fail to point in

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<sup>17</sup> See, e.g., Russell Korobkin & Chris Guthrie, Psychological Barriers to Litigation Settlement: An Experimental Approach, [93 Mich. L. Rev. 107 \(1994\)](#) (finding effects of "equity seeking" and "reactive devaluation" on settlement behavior); Mark Kelman, Yuval Rottenstreich & Amos Tversky, Context-Dependence in Legal Decision Making, [25 J. Legal Stud. 287 \(1996\)](#) (describing effects of "compromise" and "contrast" behavior on jury decisionmaking).

<sup>18</sup> See Symposium, Law, Economics & Norms, [144 U. Pa. L. Rev. 1643 \(1996\)](#).

<sup>19</sup> See Lawrence Lessig, The Regulation of Social Meaning, [62 U. Chi. L. Rev. 943 \(1995\)](#); Richard H. McAdams, Relative Preferences, [102 Yale L.J. 1 \(1992\)](#). McAdams' work draws on Robert H. Frank, *Choosing the Right Pond* (1985).



systematic directions; such patterns would not generate distinct predictions (although they would of course matter to a full account of individual behavior). Our focus here is robust, empirically documented phenomena that have reasonably precise implications for legal issues.

30 B. Testable Predictions

31 Behavioral and conventional law and economics do not differ solely in their assumptions about human behavior. They also differ, in testable ways, in their predictions about how law (as well as other forces) affects behavior. To make these differences more concrete, consider the three "fundamental principles of economics" set forth by Richard Posner in his *Economic Analysis of Law*,<sup>20</sup> in a discussion that is, on these points, quite conventional. (Posner's discussion represents an application of the basic economic methodology set forth by Becker above.<sup>21</sup>) To what extent would an account based on behavioral law and economics offer different "fundamental principles"?

32 The first fundamental principle for the conventional approach is downward-sloping demand: Total demand for a good falls when its price rises.<sup>22</sup> This prediction is, of course, valid. There are few if any documented cases of Giffen goods (goods that are consumed more heavily at high prices, due to the fact that the price increase makes people unable to afford goods that are even pricier than the good in question). However, confirmation of the prediction of downward-sloping demand does not suggest that people are optimizing. As Becker has shown, even people choosing at random (rather than in a way designed to serve their preferences) will tend to consume less of a good when its price goes up as long as they have limited resources.<sup>23</sup> This behavior has also been demonstrated with laboratory rats.<sup>24</sup> Thus, evidence of downward-sloping demand is not evidence in support of optimizing models.

33 The second fundamental principle of conventional law and economics concerns the nature of costs: "Cost to the economist is 'opportunity cost,'" and "'sunk' (incurred) costs do not affect decisions on prices and quantity."<sup>25</sup> Thus, according to traditional analysis, decisionmakers will equate

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<sup>20</sup> Posner, *supra* note 6, at 4.

<sup>21</sup> See *id.* at 3.

<sup>22</sup> See *id.*

<sup>23</sup> Gary S. Becker, *Irrational Behavior and Economic Theory*, 70 *J. Pol. Econ.* 1, 4-6 (1962).

<sup>24</sup> John H. Kagel, Raymond C. Battalio & Leonard Green, *Economic Choice Theory: An Experimental Analysis of Animal Behavior* 8, 17-19, 24-25 (1995).

<sup>25</sup> Posner, *supra* note 6, at 6, 7.

opportunity costs (which are costs incurred by foregoing opportunities - say, the opportunity to sell one's possessions) to out-of-pocket costs (such as costs incurred in buying possessions); and they will ignore sunk costs (costs that cannot be recovered, such as the cost of nonrefundable tickets). But each of these propositions is a frequent source of predictive failures. The equality of opportunity costs and out-of-pocket costs implies that, in the absence of important wealth effects, buying prices will be roughly equal to selling prices. This is frequently violated, as is well known. Many people holding tickets to a popular sporting event such as the Super Bowl would be unwilling to buy tickets at the market price (say \$ 1000), yet would also be unwilling to sell at this price. Indeed, estimates of the ratio of selling prices to buying prices are often at least two to one, yet the size of the transaction makes it implausible in these studies to conclude that wealth effects explain the difference.<sup>26</sup> As described below, these results are just what behavioral analysis suggests.

- 34 The traditional assumption about sunk costs also generates invalid predictions. Here is one: A theater patron who ignores sunk costs would not take into account the cost of a prepaid season pass in deciding whether to "rouse himself ... to go out" on the evening of a particular performance;<sup>27</sup> the decision would be made purely on the basis of the benefits and costs from that moment forward. However, in a study of theater patrons, some of whom were randomly assigned to receive discounted prices on prepaid passes, the patrons who received discounts were found to attend significantly fewer performances than those who did not receive discounts, despite the fact that (due to random assignment) the benefit-cost ratio that should have mattered - benefits and costs going forward - was the same on average in the two groups.<sup>28</sup> In short, sunk costs mattered; again, the standard prediction proved invalid.
- 35 The third fundamental principle of conventional law and economics is that "resources tend to gravitate toward their most valuable uses" as markets drive out any unexploited profit opportunities.<sup>29</sup> When combined with the notion that opportunity and out-of-pocket costs are equated (see fundamental principle two), this yields the Coase theorem - the idea that initial assignments of entitlements will not affect the ultimate allocation of

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<sup>26</sup> See Daniel Kahneman, Jack L. Knetsch & Richard H. Thaler, Experimental Tests of the Endowment Effect and the Coase Theorem, 98 J. Pol. Econ. 1325, 1327 tbl.1 (1990) (summarizing studies).

<sup>27</sup> Robert Nozick, The Nature of Rationality 22 (1993).

<sup>28</sup> Hal R. Arkes & Catherine Blumer, The Psychology of Sunk Cost, 35 Org. Behav. & Hum. Decision Processes 124, 127-28 (1985).

<sup>29</sup> Posner, supra note 6, at 11.

resources so long as transaction costs are zero.<sup>30</sup> Many economists and economically oriented lawyers think of the Coase theorem as a tautology; if there were really no transaction costs (and no wealth effects), and if an alternative allocation of resources would make some agents better off and none worse off, then of course the agents would move to that allocation. Careful empirical study, however, shows that the Coase theorem is not a tautology; indeed, it can lead to inaccurate predictions.<sup>31</sup> That is, even when transaction costs and wealth effects are known to be zero, initial entitlements alter the final allocation of resources. These results are predicted by behavioral economics, which emphasizes the difference between opportunity and out-of-pocket costs.

- 36 Consider the following set of experiments conducted to test the Coase theorem;<sup>32</sup> let us offer an interpretation geared to the particular context of economic analysis of law. The subjects were forty-four students taking an advanced undergraduate course in law and economics at Cornell University. Half the students were endowed with tokens. Each student (whether or not endowed with a token) was assigned a personal token value, the price at which a token could be redeemed for cash at the end of the experiment; these assigned values induce supply and demand curves for the tokens. Markets were conducted for tokens. Those without tokens could buy one, while those with tokens could sell. Those with tokens should (and do) sell their tokens if offered more than their assigned value; those without tokens should (and do) buy tokens if they can get one at a price below their assigned value. These token markets are a complete victory of economic theory. The equilibrium price was always exactly what the theory would predict, and the tokens did in fact flow to those who valued them most.
- 37 However, life is generally not about tokens redeemable for cash. Thus another experiment was conducted, identical to the first except that now half the students were given Cornell coffee mugs instead of tokens. Here behavioral analysis generates a prediction distinct from standard economic analysis: Because people do not equate opportunity and out-of-pocket costs for goods whose values are not solely exogenously defined (as they were in the case of the tokens), those endowed with mugs should be reluctant to part with them even at prices they would not have considered paying to acquire a mug had they not received one.
- 38 Was this prediction correct? Yes. Markets were conducted and mugs bought and sold. Unlike the case of the tokens, the assignment of property rights

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<sup>30</sup> R.H. Coase, *The Problem of Social Cost*, 3 *J. L. & Econ.* 1 (1960).

<sup>31</sup> See Kahneman et al., *supra* note 26, at 1329-42.

<sup>32</sup> See *id.*

had a pronounced effect on the final allocation of mugs. The students who were assigned mugs had a strong tendency to keep them. Whereas the Coase theorem would have predicted that about half the mugs would trade (since transaction costs had been shown to be essentially zero in the token experiments, and mugs were randomly distributed), instead only fifteen percent of the mugs traded. And those who were endowed with mugs asked more than twice as much to give up a mug as those who didn't get a mug were willing to pay. This result did not change if the markets were repeated. This effect is generally referred to as the "endowment effect"; it is a manifestation of the broader phenomenon of "loss aversion" - the idea that losses are weighted more heavily than gains - which in turn is a central building block of Kahneman and Tversky's prospect theory.

39 What are we to make of these findings? There are at least three important lessons. First, markets are indeed robust institutions. Even naive subjects participating at low stakes produce outcomes indistinguishable from those predicted by the theory when trading for tokens. Second, when agents must determine their own values (as with the mugs), outcomes can diverge substantially from those predicted by economic theory. Third, these departures will not be obvious outside an experiment, even when they exist and have considerable importance. That is, even in the mugs markets, there was trading; there was just not as much trading as the theory would predict. These lessons can be applied to other markets; we offer some examples below.

40 The foregoing discussion illustrates the point with which we began this section: The difference between conventional and behavioral law and economics is not just a difference in the validity of the assumptions about human behavior. While the assumptions of unbounded rationality, willpower, and self-interest are unrealistic, the force of behavioral economics comes from the difference in its predictions (for example, fewer trades for mugs than for tokens). In this sense, our analysis is consistent with the precept originally proposed by Milton Friedman: Economics should not be judged on whether the assumptions are realistic or valid, but rather on the quality of its predictions.<sup>33</sup> We share this view (or at least will accept it for purposes of this article); as we have emphasized, our principal interest is predictive in character. A behavioral analysis would be of much less interest if conventional economic models did a satisfactory job of predicting the behavior of agents insofar as relevant to law. Unfortunately, they often do not.

#### 41 C. Partial and Ambiguous Successes of Conventional Economics

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<sup>33</sup> See Milton Friedman, *The Methodology of Positive Economics*, in *Essays in Positive Economics* 3, 14-16 (1953).

- 42 What of all the well-known successes of conventional economics? Do they show that predictions about law based on the conventional assumptions tend to work? Consider some examples of the successes: (1) the inverse correlation between price ceilings and queues; (2) the inverse correlation between rent control and the stock of housing; (3) the positive correlation in financial markets between risk and expected return; (4) the relation between futures prices and spot-market prices.<sup>34</sup> The problem with the first three examples is that, as with tests of downward-sloping demand curves, they are quite undemanding; they ask simply whether the theory gets the direction of the effect right - and it does. But this is not a complete vindication of the theory, for the theory may misstate the magnitude of the effect. Consider (3), the positive relation between risk and return in financial markets. As predicted by this theory, stocks (equities) earn higher returns (on average) than do riskless assets such as treasury bills. But what can we say about the magnitude? Is this difference in return roughly what the theory would predict? This is precisely the question posed by Rajnish Mehra and Edward Prescott in their well-known paper on the "equity premium puzzle."<sup>35</sup> The equity premium is the difference in returns between equities and riskless assets. In the United States, the equity premium has been roughly six percent per year over the past seventy years.<sup>36</sup> This implies that a dollar invested in stocks in 1926 would, at the end of 1997, be worth over \$ 1800, while a dollar invested in treasury bills would have accumulated to less than \$ 15. This difference is remarkably large. Mehra and Prescott therefore ask whether it can possibly be explained by investor risk aversion. They conclude that it cannot. That is, no plausible value of risk aversion could explain such a big difference.<sup>37</sup> Although the theory gets the sign right in this case, the magnitude of the effect suggests that the theory is wrong. (And note that arbitrage, which we discuss just below, would not be expected to eliminate the equity premium; there are often significant costs of arbitrage in equity markets.<sup>38</sup>)
- 43 Example (4) above, the relation between spot and futures prices, does better on magnitudes. Spot and futures prices are very closely related. However, this case is special in several respects. First, arbitrage is possible. If spot and futures prices get out of line, then investors can make sure profits by buying

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<sup>34</sup> See Posner, *supra* note 6, at 18.

<sup>35</sup> Rajnish Mehra & Edward C. Prescott, The Equity Premium: A Puzzle, 15 *J. Monetary Econ.* 145 (1985).

<sup>36</sup> See Ibbotson Associates, *Stocks, Bonds, Bills and Inflation: 1997 Yearbook*.

<sup>37</sup> See Jeremy J. Siegel & Richard H. Thaler, Anomalies: The Equity Premium Puzzle, 11 *J. Econ. Persp.*, Winter 1997, at 191, 192, for a discussion.

<sup>38</sup> See Jeffrey Pontiff, Costly Arbitrage: Evidence from Closed-End Funds, 111 *Q.J. Econ.* 1135 (1996); Andrei Shleifer & Robert W. Vishny, The Limits of Arbitrage, 52 *J. Fin.* 35 (1997).

the contract that is too cheap and selling the one that is too expensive. Second, this context is one in which most of the activity is undertaken by professionals who will quickly lose their money and their jobs if they make frequent errors. Third, the markets in which these professionals operate offer frequent opportunities for learning. Under these circumstances, markets tend to work very well,<sup>39</sup> though not perfectly.<sup>40</sup> Essentially, these conditions render agents who do not conform to the standard economic assumptions irrelevant (because they will be bankrupt).

44 So, in some (fairly unusual) circumstances, such as futures trading, market forces are strong enough to make the three "bounds" irrelevant for predictive purposes. The point is important; it suggests that while human beings often display bounded rationality, willpower, and self-interest, markets can sometimes lead to behavior consistent with conventional economic assumptions. Then the question becomes when, exactly, do market forces make it reasonable to assume that people behave in accordance with those assumptions? What circumstances apply to most of the domains in which law and economics is used?

45 In this regard it is instructive to compare the market for futures contracts with the market for criminal activity. Consider the proposition that a potential criminal will commit some crime if the expected gains from the crime exceed its expected costs.<sup>41</sup> Suppose a criminal mistakenly thinks that the expected gains outweigh the expected costs, when in fact the opposite is true. First notice that no arbitrage will be possible in this situation. If someone is unfortunate enough to commit a crime with a negative expected value, then there is no way for anyone else to profit directly from his behavior. Outside of financial markets (and not always there), those who engage in low-payoff activities lose utility but do not create profit opportunities for others. Nor do they typically disappear from the market. (Even poorly run firms can survive for many years; consider GM.) Being a bad criminal is rarely fatal, and except possibly for organized crime, there is little opportunity for "hostile takeovers." Finally, the decision to enter a life of crime is not one that is made repeatedly with many opportunities to learn. Once a teenager has dropped out of high school to become a drug dealer, it is difficult to switch to dentistry.

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<sup>39</sup> See Thomas Russell & Richard H. Thaler, *The Relevance of Quasi Rationality in Competitive Markets*, in Richard H. Thaler, *Quasi Rational Economics* 239, 248-49 (1991).

<sup>40</sup> For example, in a rational market, the relation between spot and futures contracts for foreign exchange are good forecasts of movements in exchange rates. In fact, these forecasts are systematically biased. See Kenneth A. Froot & Richard H. Thaler, *Foreign Exchange*, in Richard H. Thaler, *The Winner's Curse: Paradoxes and Anomalies of Economic Life* 182, 185-86 (1992).

<sup>41</sup> See, e.g., Steven Shavell, *Criminal Law and the Optimal Use of Nonmonetary Sanctions as a Deterrent*, [85 Colum. L. Rev. 1232, 1235 \(1985\)](#).

- 46 Because law and economics is frequently applied to criminal behavior, the above argument is obviously germane. We think that the same analysis applies to many of the domains in which law and economics has been used. In fact, economic analysis of law seems to be a branch of economics in which the limits of arbitrage are particularly powerful, so special care should be taken not to push the standard economic model too far.
- 47 This is by no means to say that conventional law and economics has had no victories. One cannot look at the current state of antitrust law, or the use of market-based regulation in environmental law (to name just two of many examples), without acknowledging the important advances produced through the conventional approach. Often this approach points in the right direction and identifies flaws in noneconomic reasoning. Many advances in the positive and prescriptive understanding of law have come from the conventional assumptions. Attention to incentive effects can often reveal a great deal. (Thus, those who would argue that rent control helps tenants must contend with the obvious long-run supply effects of such laws.)
- 48 The project of behavioral law and economics, as we see it, is to take the core insights and successes of economics and build upon them by making more realistic assumptions about human behavior. We wish to retain the power of the economist's approach to social science while offering a better description of the behavior of the agents in society and the economy. Behavioral law and economics, in short, offers the potential to be law and economics with a higher "R<sup>2</sup>" - that is, greater power to explain the observed data. We will try to highlight some of that potential (and suggest cases where it has been realized) in this article.
- 49 D. Parsimony
- 50 A possible objection to our approach is that conventional economics has the advantage of simplicity and parsimony. At least - the objection goes - it provides a theory. By contrast, a behavioral perspective offers a more complicated and unruly picture of human behavior, and perhaps that picture will make prediction more difficult, precisely because behavior is more complicated and unruly. Everything can be explained in an ex post fashion - some tool will be found that is up to the task - but the elegance, generalizability, and predictive power of the economic method will be lost. Shouldn't analysts proceed with simple tools? We offer two responses: First, simplicity and parsimony are indeed beneficial; it would be highly desirable to come up with a model of behavior that is both simple and right. But conventional economics is not in this position, for its predictions are often wrong. We will encounter many examples in addition to those already discussed.

51 Second, to the extent that conventional economics achieves parsimony, it often does so at the expense of any real predictive power. Its goal is to provide a unitary theory of behavior, a goal which may be impossible to achieve. By itself the notion of "rationality" (the centerpiece of traditional analysis) is not a theory; to generate predictions it must be more fully specified, often through the use of auxiliary assumptions.<sup>42</sup> Indeed, the term "rationality" is highly ambiguous and can be used to mean many things. A person might be deemed rational if her behavior (1) conforms to the axioms of expected utility theory; (2) is responsive to incentives, that is, if the actor changes her behavior when the costs and benefits are altered; (3) is internally consistent; (4) promotes her own welfare; or (5) is effective in achieving her goals, whatever the relationship between those goals and her actual welfare. We observe departures from most of these definitions; thus, with respect to (1), scholars have documented departures from expected utility theory for nearly fifty years, and prospect theory seems to predict behavior better.<sup>43</sup> With respect to (4) and (5), people's decisions sometimes do not promote their welfare or help them to achieve their own goals; and with respect to (3), behavioral research shows that people sometimes behave in an inconsistent manner by, for example, indicating a preference for X over Y if asked to make a direct choice, but Y over X if asked to give their willingness to pay for each option.<sup>44</sup> Many of our examples will thus show that people are frequently not rational if the term is understood to mean (1), (3), (4), or (5). As for (2), without some specification of what counts as a cost and a benefit, the idea of responsiveness to incentives is empty. If rationality is used to mean simply that people "choose" what they "prefer" in light of the prevailing incentives,<sup>45</sup> then the notion of rationality offers few restrictions on behavior. The person who drinks castor oil as often as possible is rational because she happens to love castor oil. Other self-destructive behavior (drug addiction, suicide, etc.) can be explained on similar grounds. It is not even clear on this view whether rationality is intended as a definition of "preference" or as a prediction.<sup>46</sup>

52 If such a notion of rationality allowed for good predictions, then perhaps

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<sup>42</sup> See Arrow, *supra* note 13, at 205-06.

<sup>43</sup> See notes 11-12 *supra* and accompanying text.

<sup>44</sup> Amos Tversky, Rational Theory and Constructive Choice, in *The Rational Foundations of Economic Behaviour* 185, 189-91 (Kenneth J. Arrow, Enrico Colombatto, Mark Perlman & Christian Schmidt eds., 1996).

<sup>45</sup> See, e.g., Tomas J. Phillipson & Richard A. Posner, Private Choices and Public Health: The AIDS Epidemic in an Economic Perspective 4 (1995).

<sup>46</sup> Thus the idea is ambiguous between the notion of "revealed preferences," in which choices define preferences, and the notion of a maximization function that lies behind and helps explain choices. Both notions raise many difficult issues. See Cass R. Sunstein, Social Norms and Social Roles, [96 Colum. L. Rev. 903, 931-38 \(1996\)](#).



there would be no reason for complaint; the problem, however, is that so high a degree of flexibility leaves the theory with few a priori restrictions. A theory with infinite degrees of freedom is no theory at all. For example, consider whether it is a paradox (as many economists think) that so many people vote (despite the virtual certainty that no one person's vote will alter the outcome). If it is a paradox, so much the worse for the rationality assumption; if it is not a paradox, what does the assumption predict? Does it merely predict that people will respond to changes in conditions - for example, fewer people will vote when it is snowing? If so, the prediction is not bad, but surely it would be possible to say, after an unusually large vote amidst the storm, that more people voted simply because voting seemed especially valiant in those circumstances (so much for predictions based on this form of rationality). Conventional economics sometimes turns to stronger forms of rationality in response, and those forms provide stronger predictions in some cases; but those predictions are often inaccurate, as described above and as illustrated by the examples considered below.

- 53 We believe that a behavioral approach imposes discipline on economic theorizing because assumptions cannot be imported at will. In a behavioral approach, assumptions about behavior should accord with empirically validated descriptions of actual behavior. For example, in the case of "fairness," specifically defined and empirically verified patterns of behavior are used to generate predictions in new contexts. ("Fairness" is not, on this view, simply a catch-all to explain any observed behavior.) This is the approach we advocate for economic analysis of law. This approach, we believe, produces a better understanding of law and a better set of predictions about its effects....