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RATIONAL CHOICE THEORY IN LAW AND ECONOMICS

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Abstract

The great appeal of law and economics has been its use of a coherent theory of human decision making (rational choice theory) to examine legal rules and institutions. While the innovations and accomplishments of that theory in the analysis of the law have been many and important, there has been a great deal of dissatisfaction among more traditional legal scholars with the rational-choice foundation of law and economics. This chapter, first, explains rational choice theory and its importance in the economic analysis of law; second, summarizes some of the literature from economics, cognitive psychology, and other disciplines that have been critical of rational choice theory; and, third, speculates on the impact of those criticisms on the economic analysis of law.
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1. Introduction

When law and economics was a new field in the legal curriculum and just becoming a regular part of academic legal discourse, the use of microeconomic theory to discuss traditional legal topics aroused interest but also suspicion and hostility. Prominent among the reasons for this suspicion and hostility was the feeling that the economist's account of human decision making - rational choice theory - was so deeply flawed that conclusions derived from that account ought to be taken with a very large grain of salt, if not rejected outright. To take one example, the economic theory of the decision to commit a crime asserted that the potential criminal evaluated the expected costs and expected benefits of the criminal act and committed the crime only if the expected benefits exceeded the expected costs.

Many traditional legal scholars, judges and practitioners to whom such examples of law and economics were given felt that the root of their unhappiness with the conclusions of the new discipline lay with the economist's contention that all decisions (like that to commit a crime) are the result of rational deliberation. The rational utility- or profit-maximizers of microeconomic theory seemed to bear very little correlation to the flesh-and-blood human beings with whom the law dealt. Therefore, to the extent that law and economics used rational choice theory as its principal theory of human decision making, the field had a difficult time in convincing traditional legal scholars that it should be taken seriously.

In this chapter I first describe the rational choice model of decision making and then give some examples of the use of that theory in law and economics. Next I describe some criticisms of rational choice theory that have been made principally by cognitive and social psychologists. And finally, I speculate on the implications of these criticisms for the economic analysis of law.

A. Rational Choice Theory

Rational choice theory is at the heart of modern economic theory and in the disciplines contiguous to economics, such as some parts of political science, decision theory, sociology, history and law, that have adopted the theory as their model of decision making. In this section I define rational choice, show how it is used in economics and describe its use in other disciplines and suggest why traditional scholars in those other disciplines find problems with rational choice theory.

2. Definitions of Rational Choice

There is no widely accepted definition of rational choice theory, but there are two important senses in which the term is used. The first is an informal sense: choice is said to be rational when it is deliberative and consistent. The decision maker has thought about what he or she will do and can give a reasoned justification for the choice. And taking choices over time or focusing on their choices about particular things, such as food or class choices in college, one expects rationality to lead to consistent (and relatively stable) choices. That is, one expects that there will be no wild and inexplicable swings in the objects of their choices and that the means chosen to effectuate the goals of the decision maker will be reasonably well-suited to the attainment of those goals (Nozick, 1993)

Like many informal definitions this one is highly imprecise. Indeed, because almost all action would seem to be deliberative and consistent, this informal definition does not seem to allow us to distinguish rational from irrational action. Everything confirms the definition and nothing refutes it.

The second sense in which the profession uses "rational choice" is more formal: consumers have transitive preferences and seek to maximize the utility that they derive from those preferences, subject to various constraints. Transitive preferences are those for which, if some good or bundle of goods denoted A is preferred to another good or bundle of goods denoted B and B is preferred to a third good or bundle of goods denoted C, then it must be the case that A is preferred to C. By contrast, if it were the case that A were preferred to B, B were preferred to C and C were preferred to A, we would find that distinctly odd - indeed, irrational. Similarly unobjectionable is the assumption that the decision maker seeks to maximize utility subject to various constraints (such as those imposed by income, time, cognitive resources and the like). Most economists find this more formal sense of rational choice to be so obvious that they never doubt it and are puzzled by those who do. (For a discussion of other formal conditions on rational choice, see Plous, 1993, pp. 80-82.)

However obvious the formal sense of rational choice may be to economists and to those in other disciplines who have adopted it as their model of human decision making, the formal sense has not been without its critics. Two such criticisms are worth noting here. First, some have said that the formal notion of rational choice is as tautological as the informal sense. That is, there is no, or almost no, behavior that refutes the formal sense of rationality. All behavior may be said to be directed at utility maximization (who would ever do otherwise?) and all preferences can be said to be transitive. For instance, one might explain many instances of seemingly intransitive preferences as being the result of a change in preferences over time. Second, one can show some inconsistencies or puzzles in the notion of transitive preferences. Suppose that we have asked a subject how he feels about a teaspoonful of sugar. Now we add a grain of sugar to that spoonful. If the subject likes sugar, he should presumably prefer the augmented spoonful to the original on the theory that more is better. (If he does not like sugar, then he should prefer the original spoonful.) However, it is likely to be the case that the subject cannot distinguish the spoonful with one more grain of sugar from the original spoonful. If so, he may say that he is indifferent between the two. (This confusion between "more is better" and indifference is itself puzzling, but set that puzzle to one side.) If we continue to add grains of sugar to the original spoonful and ask the subject each time we do so how he compares the augmented with the previous spoonful, he will probably continue to say that he cannot distinguish and is, therefore,

indifferent. But ultimately the grains of sugar will add up to something substantially greater than the original spoonful. So, even though the subject will have contended that each successive spoonful was just as good as the original so that, by transitivity, the final heaping spoonful should be indifferent to the first, the subject is almost certain to prefer the heaping spoonful to the original teaspoonful.

3. The Uses of Rational Choice Theory in Economics

These problems notwithstanding, economists have found rational choice theory to be a very useful model for forming hypotheses about market behavior. There are five principal reasons for this. First, the theory allows economists to make predictions about economic behavior and, by and large, those predictions are borne out by the empirical evidence. For example, rational choice theory predicts and empirical work confirms, that when the wage rate rises, all other things held equal, the supply of labor increases and the demand for labor decreases; when the price of alcohol rises, relative to that of other goods and services, the quantity demanded goes down (if not by much); when the price of a good or service rises, again, relative to that of other goods and services, productive effort tends to shift into the supply of that good or service; and when the price of an input rises relative to that of its substitutes, producers tend to use less of that input and relatively more of the substitutes. These sorts of results are so widespread, so familiar to professional economists and so central to the tenability of modern microeconomic theory that it is not surprising that rational choice theory forms such an important part of the canon of modern microeconomics.

Second, whenever there are seeming deviations from the predictions of price theory, economists can usually explain those deviations without having to assume that the decision makers involved are irrational. If the deviations are a matter of degree (for example, an increase in the tax rate on incomes above $250,000 was followed by a much smaller increase in government revenues than predicted), there are a large number of hypotheses that can explain this deviation that are well short of questioning the rationality of the parties involved. To take just one such hypothesis, there may have been means by which those with incomes over $250,000 could shelter income from the tax authorities that had not been worth pursuing until the tax rate increased. Alternatively, one might argue that the deviation from the prediction of rational choice theory is a statistical fluke, due to some oddity of the data set, that the seeming anomaly is the result of the decision makers' not having had the appropriate information to reach the result predicted by the theory, that there was some theretofore unnoticed market

failure, such as monopoly or monopsony, external costs or benefits, public goods, or informational asymmetry, that accounts for the discrepancy between the theory's predictions and the observed behavior. These statistical and structural problems are real and common, so that economists are not themselves being irrational in clinging fiercely to rational choice theory in the face of seeming anomalies in the theory's predictions.

Third, an economist may explain behavior that seems anomalous to rational choice theory by appeal to a slight emendation of the theory. Suppose, by way of example, that someone demonstrates that for a particular good, when the price rises, all other things held equal, the quantity demanded *increases*. Is this sufficient evidence on which to abandon the rational choice theory? Typically not. For instance, in the case of a good whose quantity demanded *rises* rather than falls when the price of the good increases, one might propose a new phenomenon called a "snob effect", which arises when consumers take an increased price for a good as a sign of its desirability, not as a sign to switch to cheaper alternatives. As a consequence, the demand curve for a good subject to a snob effect may slope upward, to indicate that an increase in the price of that good leads to an increase in the quantity demanded (Liebenstein, 1950).

Fourth, there is a strong presumption among economists in the evolutionary fitness of rational behavior - at least in the economic realm. That is, rational consumers will prosper, while irrational consumers will squander their resources and, perhaps, become money pumps for rational calculators. More importantly, rational profit-maximizing businesses will dominate those businesses that do not operate according to a rational plan.

Fifth and finally, Professor Gary Becker has shown that even if there were consumers who behaved irrationality, in the sense of having intransitive preferences, the standard predictions of price theory (such as that an increase in the relative price of a good will lead to a decline in the quantity of that good demanded) would still hold (Becker, 1962). Since that article appeared, there have been more formal demonstrations that the conclusions of price theory and of welfare economics are not much affected by the presence of even a large number of consumers with intransitive preferences. Therefore, while irrationality might still be an issue with respect to the behavior of certain individuals, it is not an issue with respect to aggregate behavior in markets and may, as a result, be ignored.

The point of all this is to suggest that there are plausible reasons why economists cling tenaciously to rational choice theory. The theory is extremely useful and powerful. Its predictions are frequently accurate and a valuable guide to the formulation of public policy. And it is facile enough to explain phenomena that seem anomalous without necessitating an abandonment of the theory.

4. The Use of Rational Choice Theory in Other Disciplines

Criticisms abound when scholars seek to use rational choice theory to describe non-market behavior, as has been the case in such oppressed disciplines as demography, history, biology, political science, international relations and law. None of these disciplines involves explicit market choices, but all of them have been revolutionized by the importation and use of rational choice theory.

Why has rational choice theory been so attractive to some scholars in these contiguous disciplines? The principal reason is that the theory is the most complete and coherent account of human decision making in the social sciences. Moreover, the acknowledged success of economics in the public policy arena in the past fifty years, which may be attributed in part to its grounding in a coherent theory of rational behavior, may have inspired emulation of the modeling aspect of economics by other disciplines in the hope that this will lead to academic and policy successes similar to those of economics.

But, as I noted, there have been sharp criticisms of rational choice theory in the study of non-market behavior. Why should this be the case? One possible answer is that traditional scholars are threatened by rational choice theory: it is an unfamiliar technique, wielded principally by young scholars and clearly threatens the academic standing of those who use traditional methods. But there is more to the objections than mere self-interest. Put in a light most favorable to the objectors, their query may be put this way: Rational choice theory may be fine for the consideration of explicit market decisions - such as which car to buy, whether to lease the car or to purchase it with a loan, which job to take and what terms and conditions to accept and how to invest one's savings. These are, after all, quantifiable decisions. They all involve money and that currency allows comparison among different economic courses of action. But what reason is there to believe that non-market decisions - such as whom to marry or how many children to have or how to care for each of them or whether to trust one's ally in foreign affairs and so on - are made according to the same calculations?' Put someone succinctly, the question is 'Why is the rational choice model suitable to market behavior but not to non-market behavior?' The question is a serious one and deserves an answer.

I can think of three factors that might make the rational choice model a better general model for market choices than for non-market choices. First, market choices are frequent and routine. Even if people make mistakes when they make their first market choices, they have an opportunity to learn through repeated transactions. Moreover, in those instances in which market transactions are rare in an individual's life - as, for example, the purchase of

a house, there are many people who *have* made these purchases, so that there is the possibility of learning from others about the pitfalls of those rare transactions. Nonetheless, the general point bears making that market choices are more problematic for individuals, the rarer they are. Related to this matter is the fact that many non-market choices are so infrequent that people do not have repeated opportunities to learn and to make corrections. Love and marriage are examples. Even though one might consult others for their experiences with these infrequent decisions, each individual's circumstances with respect to many of these non-market choices are so highly particularized that the others' experiences may not be an appropriate guide to one's own best course of action.

Second, as already noted, market choices are mediated through a common medium - money - that makes commensurability easier. We do not have problems of 'comparing apples and oranges' in many market transactions because the choices almost always involve the purchaser's giving up money. Because the purchaser knows or could know the market price of other goods and services or can compute an opportunity cost, he or she can make a fairly accurate estimate of the comparative worth of very different courses of action, such as whether to purchase or lease a new car or whether to spend another year in school or get a job. By contrast, non-market choices usually do not involved a common measuring rod like money. Therefore, making comparisons across non-market alternatives or between a market and a non-market alternative may be very difficult. How does one compare the profound experience of parenthood with the cost of an exotic vacation?

Third, there are problems of transparency in non-market choices. Market choices involve relatively straightforward comparisons, save when they are complex and reserved for specialists, as in some complicated options valuations. There is, frequently, a single best (an optimal) decision. But many non-market choices are simply difficult to understand and have a variety of suitable outcomes. Consider the decision of whether or not to invite a friend to travel a long distance with one. There is no 'correct' answer to the question and there are lots of nuanced meanings, including misunderstandings, that may be read into the question and its answer.

Taken together, these issues of frequency, commensurability and transparency may suggest why rational choice theory is widely accepted as an explanation of market choices but has difficulties in acceptance as a model of non-market choices (Ulen, 1998).

B. The Application of Rational Choice Theory in the Law

The most important, but not the only, characteristic of law and economics is its use of rational choice theory to examine legal decisions. In this section I describe the general reasons why rational choice theory may be appropriate for the description and prediction of legal decision making and give examples of the use of the theory in the analysis of private law rules of contract and tort law and in the analysis of criminal law.

5. Why Rational Choice Theory is an Appropriate Model of Legal Decision Making

Rational choice theory is one of three distinguishing characteristics of law and economics. In light of the general criticism of the applicability of rational choice theory to non-market choices given above, one is entitled to ask why rational choice is appropriate for the discussion of legal matters, most of which are non-market choices.

The answer is that many legal decisions are indeed market-like choices. They may be said to be so on the ground that legal rules create implicit prices on different behaviors and that legal decision makers conform their behavior to those prices in much the same way as they conform their market behavior to the relative prices there. For example, the law imposes a monetary sanction (called 'compensatory money damages') on those who unjustifiably interfere with another's property, breach a contract, or accidentally injure another person or his property. These money amounts may be taken to be the 'prices' of engaging in certain kinds of behavior, such as a failure to take due care or to perform a contractual obligation. Presumably, rational decision makers will compare those legal prices with those of the alternatives and will comply with the law's duties (that is, not interfere with another's property without their permission, perform a contractual obligation, or take due care) if the price for doing so is greater than the price of not doing so. For example, if the benefit of breaching a contract is $10,000 and the money damages that the breacher can anticipate paying to the innocent party are $5,000, then there is likely to be breach of contract (Cooter and Ulen, 1997; Posner, 1998). It is the central innovation of law and economics to have recognized that many legal decisions have this market-choice-like quality and that, therefore, rational choice theory is an appropriate model of much legal decision making.

6. Private Law Examples of Rational Choice Theory

I shall here give only a few broad examples of rational choice theory in private law, rather than an exhaustive survey. One particular omission deserves mention. I shall have nothing to say about the Coase Theorem, the most famous example of the economic analysis of law and a superb example of rational choice theory in private law decision making, on the grounds that this *Encyclopedia* covers that theorem extensively elsewhere. Here I merely note that the bargaining behavior that the Coase Theorem posits will occur in the absence of transaction costs precisely because the parties are rational calculators in the manner assumed by rational choice theory. Notwithstanding the fact that I have not discussed the Coase Theorem, in Part C below I shall describe some criticisms of the assumptions of that theorem and then in Part D I shall some implications for the theorem of those criticisms. Here I shall give examples of rational choice theory as it informs the economic analysis of contract law and tort law.

6.1 Contract Law

In an economic analysis of contract law, the place to begin is with the question, Why do rational parties need the law's help in concluding consensual agreements? One might well argue that in the absence of transaction costs, parties seeking to conclude agreements would not need help from the law. They would costlessly conclude mutually beneficial terms. It follows that contact law aids parties to conclude agreements when transaction costs are positive.

What gives rise to positive transaction costs in contracting? There are two general sorts of reasons. First, there may be problems in the environment in which the parties negotiate and these problems can lead to inefficiencies. For example, there could be third-party effects and in the absence of legal intervention the contracting parties are not likely to pay attention to those external effects. Additionally, one of the contracting parties could be a monopolist and could, therefore, put the other party in a situation in which 'consent' would be meaningless. The law can correct for this social cost by insisting that parties reach roughly competitive terms in their agreement.

The second general source of transaction costs in contracting are problems that individual contractors may have. For example, some parties may have unstable or intransitive preferences because, say, they are very young, insane, or suffering from Alzheimer's disease. When people have unstable or intransitive preferences, there is no guarantee that they are in a position to gauge the benefit of bargaining and cannot, therefore, form mutually beneficial agreements. Predictably, contract law does not enforce agreements in which one of the parties has unstable preferences.

The transaction costs arising from factors of the contractual environment and individual transactors may be so high as to preclude contracting or to make it take place on inefficient terms. As a general corrective, contract law can present a set of pre-determined contract terms that take account of these transaction costs and save parties the costs of specifying these terms each time they negotiate to enter an agreement.

6.2 Tort Law

According to economic analysis, the tort liability system seeks to minimize the sum of prevention, accident and administrative costs. Potential injurers and potential victims are rational calculators who compare the expected costs and benefits of various states of the world (such as those arising from taking different kinds or amounts of precaution) and, given their tastes, maximize their utility subject to several constraints. By assumption, the transaction costs between potential injurers and victims are so high that they cannot form a contractual agreement regarding their obligations in the event of an accident. That being so, the potential injurer has virtually no incentive to take the expected costs of his failure to take adequate precaution into account. As a result, there are too many or too severe accidents and potential victims may inefficiently seek to protect themselves from uncompensated injury. Economic analysis of tort law focuses on using legal rules to induce the (rational) potential injurer to internalize these costs of failing to take adequate care. Specifically, by holding out the possibility that the potential injurer will be deemed liable for failure to take due care and, if liable, will have to pay the victim's damages arising from the accident, tort law induces the rational potential injurer to take the social-cost-minimizing level of care.

As an example of the rational-choice aspect of this analysis, consider the economic view of negligence *versus* strict liability. To be extremely terse about a complex matter, economic analysis suggests that some form of negligence is efficient when precaution is bilateral and that strict liability is efficient when precaution is unilateral. The intriguing novelty in this view is the implication that the negligence standard addresses itself to both potential victims and potential injurers in order to induce *both* of them to take care.

Imagine the calculations that a rational person will make when faced with some form of the negligence standard for determining liability. Assume that this person does not know whether she will be injured or will injure; for example, she could be an automobile driver. She knows that under the negligence standard the injurer who complies with the legal duty of care will not be held liable for the victim's injuries. Therefore, if she were to be an injurer, the best thing for her to do would be to comply with the legal duty of care. That action will minimize her expected liability and, being rational, she decides to comply with the legal duty of care. But suppose that she is the

victim in an automobile accident. In that case she will almost certainly be injured by someone who has complied with the legal duty of care. (Why? Because every potential injurer is, like her, rational and will have recognized that his expected liability is zero if he complies with the legal duty of care. Being rational, he will seek to minimize his expected liability by taking the appropriate amount of care.) Having reasoned that she will be injured by a rational injurer who will not be found liable, she recognizes that if there is an accident in which she is the victim, she will have to bear her own accident losses. She must, therefore, take action so as to minimize those expected accident costs by taking the optimal amount of care (whose marginal cost equals its marginal benefit - the expected reduction in expected accident costs). Thus, negligence induces optimal care by both potential injurers and potential victims.

7. Public Law: The Decision to Commit a Crime

As a final example of rational choice theory as applied to legal decision making, consider the well-known Becker (1968) model of the decision to commit a crime. Becker hypothesized that criminals are rational calculators and that, therefore, they made their decisions about compliance with criminal law on the basis of a comparison of the expected costs and benefits of criminal and legal activity. The expected costs of crime result from multiplying the probabilities of the activity's being detected and of the perpetrator's being apprehended and convicted by the monetary value of the legal sanction and the value of any non-pecuniary losses he might suffer, such as a loss in reputation from being branded a criminal. The expected benefits of the crime result from multiplying the probability of success times the monetary and non-pecuniary benefits of the particular crime. These latter include both the value of the goods or the amount of money resulting directly from crime and such intangible but potentially valuable outcomes as being known in one's community as a law-breaker. According to the Becker model, the rational criminal will commit the crime if these expected costs are less than the expected benefits and will refrain from crime if the reverse is true. (For a critique of the Becker model's predictions, using the criticisms of Part C of this entry, see Wilson and Abrahamse, 1992).

C. Criticisms of Rational Choice Theory

Recent scholarship by some cognitive psychologists and by economists familiar with the cognitive psychological literature describes experimental

results that are difficult to reconcile with rational choice theory. The experiments have questioned implications of that theory with regard to at least four different areas. First, subjects in carefully-designed experiments seem to reject mutually beneficial exchanges when they believe that the proposed division of the cooperative surplus violates widely-accepted norms of fairness. Rational choice theory predicts that this will not happen. Second, subjects in another series of experiments in which there are several stages of bargaining involved do not devise rational strategies. Third, most decision makers have cognitive limitations that cause systematic deviations in their behavior away from that predicted by the theory of rational choice. For instance, those engaged in a common-value auction fall prey to the 'winner's curse'; and people cling to the status quo, even though an alternative likely has much greater value. Fourth, experiments have shown that people do not make decisions about uncertain outcomes in the way that the theory of rational choice predicts.

I shall briefly summarize some of these results in this section before turning in Part D to a discussion of the important implications of this literature for the rational-choice-based economic analysis of the law.

8. Rational Bargaining

Rational choice theory makes two broad claims about bargaining. One is that whenever there is a cooperative surplus greater than the transactions costs of splitting that surplus, parties will find a means of dividing the surplus. The second is that there are certain situations in which people will not fully participate in bargaining behavior, such as in the provision of and payment for public goods. Experimental evidence questions both of these claims. People apparently willingly cooperate in circumstances in which rational choice theory predicts that they will not cooperate and they frequently do not bargain in circumstances in which the theory predicts that they will.

8.1 Cooperation in the Production of Public Goods
Rational choice theory predicts that for public goods - that is, goods that exhibit non-rivalrous consumption and for which the costs to private profit-maximizing suppliers of excluding non-paying beneficiaries are prohibitively high - rationally self-interested, utility-maximizing consumers will not pay for the units of a public good from which they benefit. They will, in the classic phrase, 'free ride', that is, consume the public good without paying for it.

However, a series of experiments reveals that people *do* willingly and voluntarily pay for their share of public goods (Thaler, 1992; Ulen, 1994).

The experiments are variations on the following general set of rules. A group of people, usually college students, are brought together and each is given the same sum of money. They are told that they can invest some, none, or all of that money in something called a 'group exchange'. (The decision to invest in the group exchange is a secret one. That is, one does not know whether or not the other players have contributed. All one knows is that they have all been given the same amount of money and are all subject to the same rules.) The group is also told that the game operator will multiply the total sum invested by the group by a number that is larger than one but smaller than the number of people in the group and will then divide the resulting sum equally among *all* of the group members, whether they have invested in the group exchange or not. These rules make the group exchange into a public good. Presumably, the temptation on rational actors will be to contribute nothing to the group exchange and then benefit with an equal share of the sum generated by the game operator.

To see how this works, suppose that there are five people in the group and that each of them is given $5. If no one contributes anything to the group exchange, then there is nothing for the game operator to multiply and nothing, therefore, for the group to divide. But suppose that only one person contributes nothing and the other four people in our example contribute their entire $5 to the group exchange. Further, suppose that the group operator doubles the resulting $20 to $40 and then distributes that sum equally among all five players. Each, therefore, receives $8. The incremental return to the four players who contributed $5 is $3, but that of the player who contributed nothing is $8. This logic should be clear to all the subjects, so that none of them should contribute to the group exchange; all of them should seek to free ride. Thus, the prediction of the theory of rational choice is that no one will invest in the group exchange.

In laboratory experiments of this game, the predictions of rational choice theory are not borne out. Although not everyone contributes to the group exchange, a substantial number *do*. On average, subjects in the experiments contributed between 40 and 60 percent of their initial sum to the public good. When experimenters vary the conditions of the game - by, for example, increasing the number of times the game is played, giving the players some prior experience with the game, or increasing the size of the stakes - the general outcome is the same: contributions to the public good are well above what the theory of rational choice would predict. The only exception to the 40-60 percent contribution rate was when the subjects were graduate students in economics at the University of Wisconsin. The contribution rate for that group was only 20 percent (Marwell and Ames, 1981).

One variation of the experiment is particularly interesting: that of the players repeating the game several times. Rational choice theory would

predict that with repeated plays the rate of contribution to the group exchange would decline (perhaps because the players would come to understand the disadvantages of contribution and the advantages of free riding). And that is what the experimenters found. (There is some controversy about whether the decline is rapid or gradual, but there is agreement that there is decline.) Were the reasons for the decline those given by rational choice theory? Plausible as the theory's conjecture sounds, it is not supported by the experimental results. The 40-60 percent cooperation rate of the earlier experiment is found to hold on the first trial of the game *even for experienced players* - that is, even for those players who have participated in other multiple-play public-goods experiments in which the contribution rate fell with repeated plays. Andreoni confirmed this surprising result in the following way. He assembled a group to play the public-goods experiment and announced the usual rules of the game and, further, that the game would be played for ten trials. He found, as expected, that the contribution rate declined over the course of those trials. At the end of the ten trials, he announced that the same players would play the game for an additional ten trials. When the game was re-started for the second run of ten trials, the participation rate rose back to the 40-60 percent range before declining again. (Andreoni, 1988)

These experimental results present a puzzle for rational choice theory: why do people cooperate when there appears to be a rational basis for *not* cooperating? One possibility is that people start any given interaction from the presumption that it is better to cooperate than not; they continue to cooperate until the evidence shows this to be ill-advised; and then they quit cooperating.

8.2 Rational Bargaining over a Cooperative Surplus
Rational choice theory offers no prediction about the particular proportions in which voluntary traders will divide a cooperative surplus; it merely suggests that if such a cooperative surplus exists and, very importantly, if there are no serious impediments to exchange (that is, no transaction costs), traders will find a way to divide that cooperative surplus so that both of them are better off than they would have been if they had not traded. The theory provides a complete explanation for exchanges that do take place and those that do not: if a voluntary exchange takes place, then there must have been a cooperative surplus to be divided and the impediments to exchange must have been trivial; if an exchange does *not* take place, then there was either no cooperative surplus to be divided (that is, the minimum price for which the seller was prepared to sell was greater than the maximum price the buyer was prepared to pay) or the costs of concluding an exchange were greater than the cooperative surplus. Rational choice theory offers no other reasons

for a failure to exchange. Clearly, what would be troubling for rational choice theory would be exchanges that failed to materialize even though there was a cooperative surplus to be divided and there were no impediments to exchange.

Experimenters have probed these possibilities in a very wide-ranging series of experiments regarding the 'ultimatum bargaining game'. (Guth, Schmittberger and Schwarze, 1982). The game works as follows. There are two participants, call them Player 1 and Player 2. They do not know one another and are not allowed to communicate. The object is to divide a fixed sum of money, say, $20. Player 1 makes an offer to divide the sum; Player 2 then either accepts the division, in which case the players receive the actual division proposed by Player 1, or rejects it, in which case they each receive nothing. Thus, if Player 1 proposes that they each receive $10 and Player 2 accepts that proposal, that is what they actually receive. If Player 1 proposes that he receive $19 and Player 2 receive $1 and if Player 2 accepts that, that is what they each receive; if Player 2 rejects that division, they each receive nothing.

The prediction of rational choice theory is that Player 1 will recognize that the best thing for her to do is to propose a one-sided division of the fixed sum in her favor. This is because Player 2 will then be in the position of accepting whatever Player 1 proposes or getting nothing and the clearly rational thing for Player 2 to do is to accept something rather than nothing.

The experimental results do not confirm the prediction of rational choice theory. Those in the position to make the initial proposed division generally do *not* propose a one-sided division in their favor. Rather, in a wide-ranging number of experiments over many years and in many different countries, the modal (that is, most common) proposal is for a 50-50 split and the mean proposal has been for a 37-73 split. Nor was the prediction for the sheepish acquiescence of Players 2 to the proposed division confirmed. Most of them accepted the split (presumably because the modal proposal was an even split), but, interestingly, almost 25 percent of the proposals were rejected (with the most one-sided proposals being almost uniformly rejected) (Kahneman, Knetsch and Thaler, 1986).

There have been numerous variations on these basic versions of the ultimatum game. In every instance, no matter how complex the experimenters make the game, the results offer little support for rational choice theory's account of how people do or ought to behave.

8.3 The Endowment Effect or Status Quo Bias

Recall that rational choice theory predicts that in the absence of transaction costs and in the presence of a cooperative surplus, there will be an exchange. One of the most important discoveries in the experimental literature is an

effect that suggests that bargains will not necessarily take place under the ideal conditions posited by rational choice theory. The reason is the presence of what is called an 'endowment effect' or 'status quo bias'. Thaler defines that effect as 'the fact that people often demand much more to give up an object than they would be willing to pay to acquire it'. (Thaler, 1992, p. 63). The closely related 'status quo bias' may be defined as a general preference for the current state of holdings over any alternative (Korobkin, 1994; Samuelson and Zeckhauser, 1988).

The endowment effect surfaced in laboratory experiments (Thaler, 1992; Korobkin, 1998). Experimenters intent on testing propositions about bargaining typically gave half the subjects something of value (for example, a lottery ticket, ballpoint pens, or a coffee mug) and the other half a sum of money. One member of each group was paired with a member of the other group. The pairs were then given an opportunity to exchange; the roles were then re-assigned and the participants again had an opportunity to exchange. This reversal of roles was done a number of times with the understanding that only one of the attempted exchanges would actually be executed by the experimenters. The subjects were given ample opportunity to learn the rules of the game.

The purpose of the experiments was to test two propositions about exchange suggested by rational choice theory. First was the proposition that when there are no impediments to exchange, goods and services will move to those who value them the most. Because there were no impediments in the experiments, the tickets, ballpoint pens and coffee mugs should end up in the hands of those who valued them the most. Sometimes that would be the subject to whom the items had been originally given and sometimes it would be to the person to whom cash had been given. Because the investigators did not know beforehand what the tastes and preferences of the subjects were, their prediction was that approximately half of the pairs would engage in an exchange.

Second was a proposition about the prices at which the exchanges would take place. Because of the role reversals and the repetition of the possible exchanges, each subject found herself alternately in the role of seller and buyer of the same object. The prediction of the experimenters was that the prices asked by subjects in their role as sellers ought to be roughly the same as the prices bid by them in their role as buyers.

The experiments confirmed neither of these propositions. First, far fewer transactions took place than the theory predicted - approximately half those anticipated. Second, the prices asked by those who were willing to sell and those bid by those who were willing to buy were not in equilibrium. The ratio of the median selling price and the median buying price was

approximately 2 to 1. These results were invariant to the objects being exchanged and to other important factors.

9. Choice under Uncertainty

The rational choice theory of decision making under uncertainty posits that decision makers attempt to maximize their *expected* utility by combining three elements: their attitudes toward risk (risk neutrality, risk preferring, or, the most commonly-assumed attitude, risk aversion); their stable, well-ordered preferences for the possible outcomes; and estimates of the likelihood of the various possible outcomes. But some recent experimental results suggest that this is not an accurate description of how many people make decisions about uncertain outcomes.

9.1 Preference Reversals
Consider the following choice under uncertainty. There are two gambles, call them *H* and *L*. *H* entails a high probability of winning a small prize, say, a 90 percent chance of winning $4. *L* entails a low probability of winning a larger sum, say, a 10 percent chance of winning $40. When presented with these alternatives, most people choose *H*. The subjects were then asked to say for what price they would be willing to sell each gamble if they owned it (as, say, a lottery ticket). Surprisingly, most subjects put a higher price on *L* than on *H* (Lichtenstein and Slovic, 1971). This is surprising because the expected value (the product of the probability of winning and the value of winning) is almost identical in the examples given. What is curious about this is that although when put to a choice between *H* and *L* most people choose *H*, when asked to price the two gambles, most people attribute a higher selling price to *L* than to *H*, which indicates that they find *L* more valuable than *H*. The figures are dramatic. One scholar reports that in a recent replication of the experiment that used the values given above, 71 percent of the subjects preferred *H* but 67 percent priced *L* above *H* (Thaler, 1992, p. 84). If one had predicted an outcome on the basis of expected utility maximization, one would have confidently predicted that these choices would have been consistent. That is, if *H* were preferred to *L*, then the imputed selling price of *H* would have been higher than that of *L* and vice versa. But that consistency is not at all what the experimenters have found.

This curious phenomenon is called 'preference reversal'. In so far as there is a simple explanation for these reversals, it is that people apparently use the payoffs rather than the expected values of gambles in pricing them. What is troubling about this explanation for rational choice theory is that if it is true, it can lead people to the sort of inconsistent and seemingly

irrational choices shown in the experiments. In the extreme, of course, one can make sport of people who behave in this fashion by getting them to make preposterous offers for very low probability gambles that have huge monetary payoffs, a fact that may be evident to the organizers of state-operated lotteries (Grether and Plott, 1979).

Three possible explanations have been given for preference reversals: intransitive preferences, procedure invariance and violations of the independence axiom. Let us take these possibilities up in turn.

As we have already seen, one of the common definitions of rationality in economics is that preference orderings exhibit transitivity. It is easy to see that the preference-reversal phenomenon might imply intransitive preferences. A rational person ought to be roughly indifferent between the imputed cash value of H and H itself. Similarly, a rational person ought to be roughly indifferent between the imputed cash value of L and L itself. If, therefore, one prefers H to L, then she ought, by transitivity, to prefer the cash value of H to the cash value of L. But preference reversal means that when H is preferred to L, the cash value of L is preferred to the cash value of H. It turns out that this pattern of preferences is intransitive only if something called procedural invariance does not hold.

'Procedural invariance' refers to a result's being invariant to the particular procedure designed to measure it. And most scientific investigation presumes procedural invariance to hold. The distance from Berlin to Munich should be the same whether we start our measurement in Berlin and go south or in Munich and go north. In the context of choice under uncertainty, the phrase refers to the invariance of preference rankings when the investigator uses different means of eliciting the subject's preferences. It is standard in modern economics to say that A is preferred to B if A is selected when both A and B are available *or* if the subject has a higher reservation price for A than for B. That is, we can determine the preference ranking by two different procedures: either presenting the subject with the choice and seeing which she chooses or by asking the subject which good has the higher reservation price per unit. It is almost never stated as an axiom in microeconomics (but probably should be) that these different procedures must yield the same result. The notion is that the preference ranking of A and B is (or ought to be) independent of the procedure by which the investigator determines that ranking. As a result, the preference equivalence of the cash value of H and H itself and that of the cash value of L and L itself is the result of an assumption of procedural invariance.

The third possibility is that the subjects violate the independence axiom of expected-utility theory. That axiom says, in essence, that if you prefer X to Y, then you should also prefer the chance to win X with probability p to the chance to win Y with probability p. This seems as straightforwardly

appealing as does the axiom of transitivity, but it turns out that the independence axiom is sometimes violated in decision making under uncertainty (Machina, 1990). The preference-reversal phenomenon would clearly be a violation of this axiom.

9.2 Intertemporal Choice

Decision making over uncertain outcomes frequently involves choosing between a current and a future outcome or between two future outcomes. There is a standard, rational-choice-based theory of this allocation of resources over time, but there is now experimental evidence that contradicts this theory. People seem not to be fully aware of the special problems and opportunities that the passage of time raises. As a result, they frequently make decisions about the allocation of resources over time that seem to be difficult to square with rational choice theory. Take the example of paying income taxes. Many taxpayers routinely have too much income tax withheld during the year so that they can receive a refund from the Internal Revenue Service after filing their tax returns in the Spring of the following year. This over-withholding constitutes an interest-free loan to the federal government. The taxpayers who currently do this would be better off (according to rational choice theory) if they were to reduce the amount withheld so that at the end of the year they neither owed money to nor were owed money by the IRS.

At the other extreme are examples of absurdly high discount rates. For example, people routinely ignore the warnings of dermatologists that over-exposure to the sun can cause skin cancer later in life, apparently preferring the current benefits of a suntan. But they may pay attention if the dermatologist tells them that the sun may cause large pores or blackheads in the near future. Most homeowners do not have nearly enough insulation in their attics and walls, even though the cost of installing more would lead to significant savings on energy use within one year. Nor do they buy more expensive energy-efficient appliances, even though the energy-use savings will more than make up for the increased purchase price within a year. Economists have calculated that the purchase of the lower-priced, less efficient appliances implies a discount rate of between 45 percent and 130 percent at low energy costs and between 120 percent and 300 percent at higher energy costs. Either set of discount rates is absurdly high.

Why do people make such anomalous decisions where intertemporal choice is involved? One of the most robust findings in the experimental literature is that discount rates decline sharply with the length of time that the subject must wait for her reward and with the size of the reward. These experimental results are not consistent with rational choice theory, which holds that discount rates should generally equal the market rate of interest, that the discount rates should be constant (that is, invariant to the period of

time considered) and certainly invariant with respect to the amount of money involved. The difficulty posed by the declining discount rate as the date of the reward recedes further into the future is that it implies an anomalous preference reversal. This is because the individual's preference as between, say, Project *A* and Project *B* could initially be in favor of *A* (because it is, let us assume, the nearer in time) and then switch to *B*, *all other things remaining equal*, if the time at which *B* will be realized is brought forward (but is still realized after *A* is realized). If discount rates are constant, this sort of switching, all other things equal, cannot occur (Loewenstein and Elster, 1992).

The effect of the size of the reward on the discount rate is as strong as the effect of time delay. The general problem is that people perceive the difference between $100 today and $150 in a year as greater than the difference between $10 today and $15 in a year. As a result, many people are willing to wait for the extra $50 in the first instance but not for the extra $5 in the second instance. Rational choice theory cannot explain this robust experimental result. Shefrin and Thaler have proposed that the explanation lies in how people take mental account of small and large windfalls. They hypothesize that small windfall gains are put into a mental account that allows for immediate consumption, while large windfall amounts are put into a separate mental account for which there is a much lower propensity for immediate consumption. Thus, the opportunity cost of waiting for a small windfall may be perceived to be foregone consumption. But the opportunity cost of waiting for a large windfall will be foregone interest or investment. If foregone consumption is more difficult to resist than foregone interest or investment, that would explain the observed effect of the size of the award causing a decline in the discount rate (Shefrin and Thaler, 1988).

D. Implications of the Criticisms of Rational Choice Theory for the Economic Analysis of Law

As we have seen, law and economics has premised much of its scholarship on rational choice theory. Therefore, the implications of the literature critical of that theory for law and economics are profound. In this part I want to focus on four of those implications - on the relationship between transactions costs and the law, on the choice between mandatory and default rules in the law, on the best means of dealing with risky decisions by consumers and on some issues in tort law.

10. The Coase Theorem and Criticisms of Rational Choice Theory

The most famous piece of scholarship in law and economics is 'The Problem of Social Cost' by Professor Ronald Coase (1960). The broad inquiry to which that article is addressed is this: when may society rely upon bargaining to achieve the efficient use of resources and when may it not? That inquiry then leads to a discussion of how the law should be structured so as to encourage efficient resource use in those circumstances in which it is inappropriate to rely upon bargaining. The Coase Theorem says that when there are no impediments to exchange (that is, when transaction costs are zero), the efficient use of resources will result, regardless of the assignment of property rights. Appropriate legal policy depends on being able to identify impediments to exchange and to specify correctives when those impediments are significant. Law and economics scholarship has concentrated on search, bargaining and enforcement costs as the elements of transaction costs and has sought to identify the objective characteristics of transactions (for example, the number of people involved, whether the transaction is for a fungible or a unique item and so on) that cause these three elements of the costs of exchange to be high.

The literature reported in Section 8 has two important implications for the standard view of the Coase Theorem. First, the reported results on cooperation and fairness suggest that people are far more ready to cooperate and that they have a much stronger sense of what is an equitable outcome than rational choice theory predicts. These conclusions point in two very different directions on the Coase Theorem. On the one hand, the broad willingness to cooperate (as revealed in the public goods experiments) suggests that voluntary exchange may be able to achieve an efficient allocation in a *broader* range of circumstances than those of zero transaction costs and, further, that the need to intervene in private decision making to enhance efficiency, even when transaction costs are positive and significant, may be *less* than previously thought. For example, if people appear to be more willing to contribute to the provision of public goods than rational choice theory predicts, then there may be less need for the compulsory public subsidization of those goods or the level of subsidization can be less extensive. There are implications, too, regarding the need for or the most appropriate structure of environmental regulations - for example, people may be more willing to bestow the external benefits of environmentally-conscious activity than previously supposed.

On the other hand, the finding of the experimental literature that people appear to be extremely sensitive to the equitable distribution of resources suggests that *more* intervention in private decision making may be justifiable than previously thought. This is because the experiments suggest that people

may be so sensitive to fairness issues that they would rather not cooperate than cooperate on terms that they consider to be excessively one-sided. This is a cause for the failure of bargaining that has not heretofore been given much weight. Even when transaction costs are very low, some otherwise efficient exchanges will *not* take place because some of the participants do not like the proposed division of the cooperative surplus. The experimental findings provide an *efficiency* justification for legal intervention in private decision making in order to prevent over-reaching by one of the parties that might forestall an otherwise efficiency-enhancing exchange.

The second major implication for the Coase Theorem of the criticisms reported in Section 8 arises from the endowment effect (or status quo bias). Recall that that effect suggested two anomalies in bargaining behavior: first, when transaction costs were very low, people were far more reluctant to transact than rational choice theory predicted and, second, subjects typically demanded twice as much to sell something they owned as they were willing to pay in order to acquire it. The troubling implication of those findings is that there may be cases in which there is no such thing as a uniquely efficient assignment of rights. Where society initially assigns an entitlement is where it is likely to remain; we should be far less sanguine about entitlements moving to their highest-valued use, even when transaction costs are zero, than we have been heretofore. (Indeed, status quo bias makes the notion of 'highest valuing use' less clear.)

11. Default and Mandatory Rules and the Criticisms of Rational Choice Theory

If one assumes, as does law and economics, that the law can increase the efficient use of resources by creating rules of conduct that correct for market failures, two issues that must be resolved are, first, the specification of a rule or standard and, second, whether that rule or standard is mandatory or may be waived by those affected. One of the areas of the law in which this issue has been central is corporation law. There the debate has been between those who favor non-waivable mandatory rules of corporate conduct and those who favor allowing corporations to opt out of some rules. Consider, for example, insider trading. Everyone admits that there are potential inefficiencies from allowing insider trading, although there are disagreements about the extent and likelihood of these inefficiencies. Most commentators, therefore, agree that there ought to be some legal regulation of the practice. However, there is disagreement about whether this regulation should take the form of a prohibition or merely a default rule from which those corporations that so choose might wish to opt out. Those who favor

making the prohibition waivable argue that some corporations might wish to offer their managers partial compensation in the form of allowing them to trade on the basis of the inside information that they acquire in the course of working for the corporation. If that method of compensation is more efficient than the alternatives, then, the argument goes, those corporations and their managers ought to be allowed to opt out of the default rule. The other side argues that both private and public difficulties in policing the behavior of managers make the realization of those efficiencies illusory. Thus, they argue, the prohibition of insider trading should be non-waivable.

How are the findings of Part C relevant to this issue? Status-quo bias suggests that people will not make changes away from a default position unless the expected benefits from so doing substantially exceed the expected costs. That is, the default position has a strong anchoring effect. With respect to insider trading rules, the presence of status-quo bias might indicate that even if the prohibition on insider trading was waivable, very few corporations would take advantage of that waivability.

There is another relevant implication of status-quo bias. If most people are reluctant to leave the status quo, whatever that is, then the law ought to establish the starting position (that is, establish the status quo) at an efficient point. In the case of insider trading that might suggest that the appropriate starting point is a prohibition of the practice, not the freedom to engage in the practice unless one's employer has forbidden it. This sort of consideration no doubt has other applications in the law well beyond corporation law. For instance, it may say something about whether society should make the status quo one in which addictive drugs are legal or one in which they are illegal but one may (explicitly or implicitly) opt out of this illegality. (For the implications of status quo bias for a broad range of contract issues, see Korobkin, 1998.)

12. Risk Regulation and the Criticisms of Rational Choice Theory

The regulation of risk is a topic upon which there is very large and growing literature and about which there is a surprising lack of consensus. Many are convinced that the panoply of regulations dealing with risky behavior is not well conceived and the criticisms of rational choice under uncertainty contribute to an understanding of this position. Recall that, broadly speaking, people do not seem to do a very good job of appraising risky outcomes. For example, they tend to overestimate the value of low-probability, high-payoff gambles. And because of status-quo bias, they prefer a known, high risk to an unknown, low risk. These imperfections in the way people deal with risk may motivate them to demand legislative regulation of risk that reflects their own, not entirely coherent, views. For

example, on an average day in the United States 30 people are killed on the job, 56 are killed in accidents in the home, 133 die in automobile accidents and 4,000 die from cancer. Of those who die each day from cancer, 30 percent of those deaths are attributable to tobacco; 4 percent are attributable to cancers arising from occupational hazards; 1 percent to medical treatment; and 2 percent to air and water pollution (Breyer, 1993). All other things equal, these figures would suggest two predictions about current regulations designed to minimize the harms from risky activities: first, that a large amount of effort ought to be directed at reducing the risk of cancer and second, that a large portion of the cancer-reducing effort ought to be directed at tobacco-related cancers. Neither prediction is correct. Rather, the risk regulation of the United States government has a willy-nilly aspect with little rational regard for the value of the good it might be doing. For instance, there is no single implicit value of a life saved that is used by the federal government in regulating risk. Rather, the government's regulations imply that the value of a life saved ranges from $10,000 to $1 billion (Viscusi, 1992).

Just bringing coherence to risk regulation would be a substantial improvement in the efficient allocation of governmental resources. But the experiments on decision making under uncertainty described in Section 8 suggest an important new way of looking at the regulation of risk. Heretofore, much government risk regulation has been premised on the belief that individuals make errors in dealing with risk because they do not have correct information. If they had that information, they would make the appropriate maximizing decision. Thus, the government's role ought principally to be to disseminate accurate information to assist individuals and organizations in their decision making. But the material on intertemporal choice in Part C suggests that even if they had the appropriate information, some people would not make the right decision about risky activities.

How these insights should translate into a reform of risk regulation is a very broad issue. Here I want only to suggest that they might lead to principled justifications for far more paternalistic policies than those that rational choice theory typically recommends. For instance, where rational choice theory might suggest that the comparison of the costs and benefits of wearing motorcycle helmets ought to be left to motorcyclists so long as they are well-informed about the *true* costs and benefits, the findings about mistakes in intertemporal choice and in the assessment of risk imply that motorcyclists will always underestimate the benefits of wearing helmets and that, therefore, the best regulation for minimizing head injuries among motorcyclists may be one mandating helmet-wearing. These are significant differences in policy and we must wait on further empirical work to clarify the extent of the cognitive errors and the various policy choices before us.

13. Tort Law and the Criticisms of Rational Choice Theory

Finally, I come to the issue of whether the anomalies discussed in Part C affect the economic analysis of tort law. The connection between those anomalies and the economic analysis turns, I think, on this central issue: the economic analysis perceives that potential victims and potential injurers are capable of understanding and acting rationally in response to the implications of the tort liability system for their choices about which activities to pursue, how and when to pursue those activities, how cautious they should be, how much they should spend on warnings of danger to others and the like. If those whose behavior we seek to affect by imposing tort liability do not have the cognitive abilities to understand and act in accord with the law's desires, then we should not be surprised to learn that the tort liability system is not achieving its desired efficiency ends. For example, if decision makers make systematic errors when faced with uncertain outcomes or if they are systematically overconfident about their abilities to avoid an accident or injury, then they may behave in ways that are contrary to those anticipated by rational choice theory. The next sections seek to clarify how these imperfections might influence several issues in the economic analysis of tort liability.

13.1 The Choice Between Statutory Regulation and the Risk-Utility Test
There are two important points to be made about the efficiency of negligence and of strict liability. First, *within* negligence there are two very different means of determining whether someone had complied with a legal duty of care. In one set of circumstances compliance is determined by comparing the victim's or injurers actions with a clear rule - for example, a speed limit or manufacturing standard proposed by an administrative agency (or possibly by some respected private standard-setting group). This sort of negligence (negligence *per se*) is relatively easy for the court to determine and easy for potential injurers and victims to perceive and to follow. No sophisticated calculations are required and, therefore, the demands on the cognitive abilities of the potential victim and injurer are not large.

The other, more common form of negligence delegates to potential injurers and potential victims the determination of the appropriate amount of care to take. There is no hard-and-fast rule specifying the suitable amount of precaution; rather, each potential victim and potential injurer calculates what is appropriate in the understanding that, in the event of an accident, a court may check those calculations to see if they have been done reasonably. This standard of due care is frequently determined according to a 'risk-utility test' or the Hand Test. The court assumes that the parties who may injure or be injured compare the costs of precaution with the benefits of

taking precaution (the reduction in the probability and severity of an accident) and that they will take all cost-justified precaution - that is, precaution that confers greater (expected) benefits than it costs.

The cognitive demands of the risk-utility test are substantial. In order to comply with the legal duties imposed by negligence, potential injurers and victims must independently form an estimate of the probability of an accident's occurring as a function of the amount of precaution they take and an estimate of the size of the accident losses that will result from various levels of precaution. An implication of the experiments noted in Part C above is that potential injurers and victims may make systematic errors in these calculations.

The potential shortcomings of human decision making with regard to risk may be the key to understanding when it is socially efficient to use the rule-like negligence *per se* and the due-care standard. Put simply, if one believes that those likely to be involved in a particular kind of accident are prone to cognitive errors and limitations, then the more appropriate method of achieving social efficiency (in the sense of minimizing the social costs of accidents) would be to state rules with which it is relatively easy to comply.

13.2 Strict Liability and Negligence

Recall that the law and economics literature has identified one principal factor that should figure in the efficient choice between negligence and strict liability: whether precaution is unilateral or bilateral. The presence of cognitive errors and limitations in the ability to perceive and act rationally upon risk complicates this distinction between unilateral and bilateral precaution. It is not unlikely that situations arise in which both the potential injurer and the potential victim *could* have taken precaution that would reduce the expected social costs of accidents but in which one of the two parties was very much less likely to have experience with the sort of calculations of risk and expectation that the economic theory supposes that both parties have. That is, a cognitive limitation in dealing with uncertain outcomes may be an independent factor in determining whether precaution was unilateral or bilateral and, therefore, in choosing between negligence and strict liability.

Consider, for example, product-related accidents. Suppose that we were free to decide for the first time which form of liability to use in those accidents and suppose further that we intend to use the economic theory exclusively in reaching our decision. Which form of liability - negligence or strict liability - ought we to use in order to minimize the social cost of product-related accidents? We might conclude that precaution is bilateral: producers can reduce the likelihood and severity of accidents by taking care in the design and manufacture of their goods and by warning consumers of

any non-obvious dangers; consumers can reduce the expected social costs of accidents by taking care in the use of the product, by following the manufacturer's instructions, by using the product in a manner that it was intended that it be used and so on. But suppose that we make one more assumption - namely, that producers have much greater facility in making decisions about uncertain outcomes than do consumer because consumers are prone to the sort of miscalculations that we noted in Part C. We might now doubt that precaution is truly bilateral. Perfectly rational consumers might be able to calculate the appropriate level of risk and the expected level of accident costs, given different levels of precaution, but these are not, by assumption, perfectly rational consumers. They will make errors; importantly, they will make *more* and *more costly* errors than will producers. If so, then a situation that assumed the affected parties to be rational and that precaution was bilateral becomes one in which only one of the parties is reliably rational and there is, therefore, unilateral precaution. This makes out an argument for treating at least some product-related accidents under the strict liability rule. To put the point more generally, I am suggesting that the recognition that there may be cognitive limitations among potential victims and injurers should alter the search for the appropriate liability standard from one in which the law looks for the least-cost avoider to one in which the law looks for the least-cost decision maker or least irrational party.

14. Conclusion

We have seen how important rational choice theory is to law and economics. But we have also seen that there is an increasing body of experimental work that questions some of the assumptions of that theory. We must amend the rational-choice model, but precisely how we should amend the model is not yet clear. I want to conclude with a cautionary statement about the crucial questions that must be addressed in undertaking these emendations in rational choice theory and in drawing conclusions about law on the basis of these emendations.

Some may mistakenly think that we are put to a stark choice between, on the one hand, rational choice theory and, on the other hand, the extreme position that no coherent theory of human decision making is possible. That is a dangerous illusion. A synthesis is possible and is, I believe, coming. But it is not yet here and until it is, we must remain uncomfortably in the middle - somewhat skeptical about rational choice theory but not so skeptical that we abandon that theory. To see the dangers of moving too far, too fast in the application of Part C's findings, consider the experiments that suggest that cooperation in the provision of a public good is much more likely than

rational choice theory predicts. This is, so far, merely suggestive; it is not a complete guide to behavior. Therefore, no one could responsibly use these experiments as a warrant for cutting the public subsidies for basic research and public television or for laxer enforcement of the intellectual property laws. Before we make policy pronouncements on the basis of these anomalies, we need to know much more. The implication of some of the experimenters is that their findings apply to *all* decision makers in *all* circumstances. But that seems highly unlikely. Surely there are important differences among circumstances and among people. There may be some people who always obey the predictions of rational choice theory; there may be some circumstances in which no one obeys those predictions. And there may be more subtle differences. For example, are there systematic differences in the dispensation to cooperate by age and gender? Are there objective circumstances about the manner in which the cooperation is solicited (for example, how long the people have known each other and whether they are allowed to communicate) that lead to a greater likelihood of cooperation? How robust is the finding that repeated playing leads to a diminution of the propensity to cooperate? These and many more questions need to be addressed.

Some day, perhaps soon, we shall have a complete account of human decision making than that provided by rational choice theory. And when we do, that account will greatly enhance our understanding of the law and our ability to draft the law for desirable ends.

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