

Chapter I

The Economics Perspective: Incentives Matter

Economics is an analytical discipline and a practical science. Its aim is to provide a set of tools to understand, analyze, and, sometimes, solve problems. Just as a physicist must take into account the effects of gravity, so too must a lawyer understand the effects of economic forces. In a very real sense, economic forces are the gravity of the social world—often invisible, but omnipresent. As imposing as this view of economics may sound, this casebook presupposes no prior exposure to economics—it concentrates on the few foundational concepts and analytical tools necessary for the lawyer to take advantage of the economics perspective.

Economics is the study of the rational behavior of individuals when choices are limited or constrained in relation to human desires. This broad definition should serve to dispel two common myths about economics. First, economics is not simply about money—it is about how incentives influence behavior. In fact, the crucial point of economics is that **incentives matter**. Second, economics is concerned with more than just economy-wide, macroeconomic phenomena such as inflation, unemployment, trade deficits, and business cycles. It also includes microeconomics, which uses individual decision-makers and individual markets as the basic units of analysis. In this casebook, the principles of microeconomics are introduced by analyzing the impact of changes in various legal rules on the behavior of economic actors.¹ Changes in laws and regulations affect incentives, and incentives matter!

Where the Buses Run on Time

Austan Goolsbee

Slate.com (March 16, 2006)

On a summer afternoon, the drive home from the University of Chicago to the north side of the city must be one of the most beautiful commutes in the world. On the left on Lake Shore Drive you pass Grant Park, some of the world's first skyscrapers, and the Sears Tower. On the right is the intense blue of Lake Michigan. But for all the beauty,

1. Microeconomics is also referred to as price theory. It is important to note that there is much more agreement among economists about certain principles of microeconomic theory than there is about macroeconomic theory and policy. See Dan Fuller & Doris Geide-Stevenson, *Consensus Among Economists: Revisited*, 34 *Journal of Economic Education* 369 (2003) (reporting results of survey of economists).

the traffic can be hell. So, if you drive the route every day, you learn the shortcuts. You know that if it backs up from the Buckingham Fountain all the way to McCormick Place, you're better off taking the surface streets and getting back onto Lake Shore Drive a few miles north.

A lot of buses, however, wait in the traffic jams. I have always wondered about that: Why don't the bus drivers use the shortcuts? Surely they know about them—they drive the same route every day, and they probably avoid the traffic when they drive their own cars. Buses don't stop on Lake Shore Drive, so they wouldn't strand anyone by detouring around the congestion. And when buses get delayed in heavy traffic, it wreaks havoc on the scheduled service. Instead of arriving once every 10 minutes, three buses come in at the same time after half an hour. That sort of bunching is the least efficient way to run a public transportation system. So, why not take the surface streets if that would keep the schedule properly spaced and on time?

You might think at first that the problem is that the drivers aren't paid enough to strategize. But Chicago bus drivers are the seventh-highest paid in the nation; full-timers earned more than \$23 an hour, according to a November 2004 survey. The problem may have to do not with how much they are paid, but how they are paid. At least, that's the implication of a new study of Chilean bus drivers by Ryan Johnson and David Reiley of the University of Arizona and Juan Carlos Muñoz of Pontificia Universidad Católica de Chile.

Companies in Chile pay bus drivers one of two ways: either by the hour or by the passenger. Paying by the passenger leads to significantly shorter delays. Give them incentives, and drivers start acting like regular people do. They take shortcuts when the traffic is bad. They take shorter meal breaks and bathroom breaks. They want to get on the road and pick up more passengers as quickly as they can. In short, their productivity increases.

They also create new markets. At the bus stops in Chile, people known as *sapos* (frogs) literally hop on and off the buses that arrive, gathering information on how many people are traveling and telling the driver how many people were on the previous bus and how many minutes ago it sat at the station. Drivers pay the *sapos* for the information because it helps them improve their performance.

Not everything about incentive pay is perfect, of course. When bus drivers start moving from place to place more quickly, they get in more accidents (just like the rest of us). Some passengers also complain that the rides make them nauseated because the drivers stomp on the gas as soon as the last passenger gets on the bus. Yet when given the choice, people overwhelmingly choose the bus companies that get them where they're going on time. More than 95 percent of the routes in Santiago use incentive pay.

Perhaps we should have known that incentive pay could increase bus driver productivity. After all, the taxis in Chicago take the shortcuts on Lake Shore Drive to avoid the traffic that buses just sit in. Since taxi drivers earn money for every trip they make, they want to get you home as quickly as possible so they can pick up somebody else.

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This chapter introduces the economics perspective by describing several fundamental concepts and assumptions. In Section A, economists' assumptions about human behavior and firm behavior as well as the key concepts of scarcity, opportunity costs, and marginal analysis are developed. In Section B, the importance of private property rights to a functioning market economy is explored. Section C contrasts the *ex ante* (forward-looking) perspective of economics with the *ex post* (backward-looking) perspective

typical of legal analysis. Section D presents game theory as an explanation for much economic behavior. Finally, Section E compares positive economic analysis, which describes the world as it is, with normative economic analysis, which describes the world as it should be.

A. Economic Behavior

The concept of scarcity is fundamental to the study of economics. **Scarcity** means that our behavior is constrained because we live in a world of limited resources and unlimited desires. Scarcity is thus a relative concept in that it indicates we cannot satisfy every desire. The fact that there is an “abundance” of a particular resource does not mean that there is not scarcity; it simply means that at current prices everyone who wants to control a certain amount of that resource can do so by paying the market price. Scarcity implies that individuals, families, governments, businesses, and other economic actors must make choices or trade-offs among competing uses of limited resources.

Economic actors are assumed to maximize their well-being subject to constraints. In this section, assumptions about what guides decision making by individuals and firms are developed.

1. Opportunity Costs, Economic Choices, and the Margin

There are only twenty-four hours in a day, and any decision to engage in one activity entails a decision to forego some other activity. People must choose how to spend their time, and choice requires a sacrifice. This sacrifice illustrates the fundamental economic concept of **opportunity cost**. In general, the opportunity cost of using a resource in a particular manner is defined as the value of the next best alternative use of that resource. For example, your time—a valuable resource—can be used in several different ways: sleeping, studying, partying, vacationing, exercising, working, eating, watching television, and so forth. The opportunity cost to you of reading this material is the next best alternative use of your time. Similarly, the opportunity cost of working as a lawyer is the next best alternative career you may have chosen.

The classic phrase that illustrates the concept of opportunity cost is “There ain’t no such thing as a free lunch,” or “TANSTAAFL.” Someone else may pay for your lunch, but you gave up some other activity in order to go to lunch. Another way to think of the concept of opportunity cost is to recognize that “whenever you have a choice, there is a cost.”

Choices or trade-offs, however, are rarely between extremes. For example, individuals are rarely faced with the choice between a twelve-course feast or going hungry; more often, individuals confront choices of a smaller magnitude—say, between steak and hamburger. Economists assert that economic actors make choices “at the margin,” where the **margin** refers to the impact of a small change in one variable on another variable. For example, if the price (cost) of a product increases relative to the prices of other products, then people “at the margin” will substitute the now lower cost product for the higher cost product. Raise the price of Toyotas and some people will buy fewer Toyotas and more (say) Nissans. Raise the price of heating oil, and even people who “need” it will substitute other products (e.g., sweaters and blankets) to keep warm. In general, the margin refers

to the difference in cost, benefit, or some other measure (e.g., profit, revenue, etc.) between the existing situation and a proposed change.

Suppose, for example, that you attempt to purchase a bag of pretzels by inserting fifty cents into a vending machine and pushing the appropriate buttons. Your actions demonstrate that your expected marginal benefit from the bag of pretzels is greater than fifty cents. Unfortunately, you failed to notice (prior to selecting the pretzels) that the next slot for a pretzel bag was empty, and you did not receive anything for your fifty cents. You are very confident that a bag of pretzels will be dispensed if you pay another fifty cents. Your friend says you are crazy to pay \$1.00 for a bag of pretzels, but you reply that on the margin the next bag costs fifty cents and that the marginal benefit to you of a bag of pretzels is still more than fifty cents. You buy the pretzels, but your friend gives you a hard time for paying so much. You then explain to him that the first fifty cents was in the past, and there was nothing that could be done about it. The first fifty cents was a **sunk cost**, and sunk costs do not affect your future decisions because you make decisions on the margin.

The basic marginal analysis decision-making rule is that *if the marginal benefit of an activity is greater than the marginal cost of that activity, then do it!* It is important to appreciate the individual basis of decision making because many costs and benefits are subjective in the sense that they differ from individual to individual. Thus, an observer is often left to infer relative costs and benefits from observed behavior. All economic analysis is concerned with consequences “at the margin.” Thus, one would expect that a change in a legal rule that affects a cost or benefit—that is, affects incentives—will have measurable (at least in principle) effects at the margin.

2. Assumptions About Human Behavior

Economists employ certain abstractions and assumptions to help predict the behavioral consequences of changes in the constraints faced by individuals, businesses, and other economic actors. One of the most important assumptions is that individuals behave rationally—that is, they seek to maximize their “self-interest.” The self-interest assumption does not mean that individuals are cold, harsh calculators; rather it means that their behavior is consistent with a model of rational choice. Self-interest also does not imply that individuals are necessarily selfish; rational decision makers may benefit—that is, receive satisfaction—from making others happy. The significance of the self-interest assumption is that it allows economists to anticipate changes in individual behavior in response to changes in economic variables. These variables include activities that are not explicitly within a market activity, such as marriage, crime, and driving. The rational maximizer responds to changes in incentives in a predictable manner.

The Nature of Man*

Michael C. Jensen and William H. Meckling
7 Journal of Applied Corporate Finance 4–19 (Summer 1994)

* * *

The usefulness of any model of human nature depends on its ability to explain a wide range of social phenomena; the test of such a model is the degree to which it is consistent

* We use the word “man” here in its use as a non-gender-specific reference to human beings. We have attempted to make the language less gender-specific because the models being discussed describe

with observed human behavior. A model that explains behavior only in one small geographical area, or only for a short period in history, or only for people engaged in certain pursuits is not very useful. For this reason we must use a limited number of general traits to characterize human behavior. Greater detail limits the explanatory ability of a model because individual people differ so greatly. We want a set of characteristics that captures the essence of human nature, but no more.

While this may sound abstract and complex, it is neither. Each of us has in mind and uses models of human nature every day. We all understand, for example, that people are willing to make trade-offs among things that they want. Our spouses, partners, children, friends, business associates, or perfect strangers can be induced to make substitutions of all kinds. We offer to go out to dinner Saturday night instead of the concert tonight. We offer to substitute a bicycle for a stereo as a birthday gift. We allow an employee to go home early today if the time is made up next week.

If our model specified that individuals were never willing to substitute some amount of a good for some amounts of other goods, it would quickly run aground on inconsistent evidence. It could not explain much of the human behavior we observe. While it may sound silly to characterize individuals as unwilling to make substitutions, that view of human behavior is not far from models that are widely accepted and used by many social scientists (for example, Maslow's hierarchy of human needs and sociologists' models portraying individuals as cultural role players or social victims).

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RESOURCEFUL, EVALUATIVE, MAXIMIZING MODEL: REMM

... While the term is new, the concept is not. REMM is the product of over 200 years of research and debate in economics, the other social sciences, and philosophy. As a result, REMM is now defined in very precise terms, but we offer here only a bare-bones summary of the concept. Many specifics can be added to enrich its descriptive content without sacrificing the basic foundation provided here.

Postulate I. Every individual cares; he or she is an evaluator.

(a) The individual cares about almost everything: knowledge, independence, the plight of others, the environment, honor, interpersonal relationships, status, peer approval, group norms, culture, wealth, rules of conduct, the weather, music, art, and so on.

(b) REMM is always willing to make trade-offs and substitutions. Each individual is always willing to give up some sufficiently small amount of any particular good (oranges, water, air, housing, honesty, or safety) for some sufficiently large quantity of other goods. Furthermore, valuation is relative in the sense that the value of a unit of any particular good decreases as the individual enjoys more of it relative to other goods.

(c) Individual preferences are transitive—that is, if A is preferred to B, and B is preferred to C, then A is preferred to C.

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Postulate II. Each individual's wants are unlimited.

(a) If we designate those things that REMM values positively as “goods,” then he or she prefers more goods to less. Goods can be anything from art objects to ethical norms.

the behavior of both sexes. We have been unable to find a genderless term for use in the title which has the same desired impact.

(b) REMM cannot be satiated. He or she always wants more of some things, be they material goods such as art, sculpture, castles, and pyramids; or intangible goods such as solitude, companionship, honesty, respect, love, fame, and immortality.

Postulate III. Each individual is a maximizer.

He or she acts so as to enjoy the highest level of value possible. Individuals are always constrained in satisfying their wants. Wealth, time, and the laws of nature are all important constraints that affect the opportunities available to any individual. Individuals are also constrained by the limits of their own knowledge about various goods and opportunities; and their choices of goods or courses of action will reflect the costs of acquiring the knowledge or information necessary to evaluate those choices.

The notion of an opportunity set provides the limit on the level of value attainable by any individual. The opportunity set is usually regarded as something that is given and external to the individual. Economists tend to represent it as a wealth or income constraint and a set of prices at which the individual can buy goods. But the notion of an individual's opportunity set can be generalized to include the set of activities he or she can perform during a 24-hour day or in a lifetime.

Postulate IV. The individual is resourceful.

Individuals are creative. They are able to conceive of changes in their environment, foresee the consequences thereof, and respond by creating new opportunities.

Although an individual's opportunity set is limited at any instant in time by his or her knowledge and the state of the world, that limitation is not immutable. Human beings are not only capable of learning about new opportunities, they also engage in resourceful, creative activities that expand their opportunities in various ways.

The kind of highly mechanical behavior posited by economists—that is, assigning probabilities and expected values to various actions and choosing the action with the highest expected value—is formally consistent with the evaluating, maximizing model defined in Postulates I through III. But such behavior falls short of the human capabilities posited by REMM; it says nothing about the individual's ingenuity and creativity.

REMMs AT WORK

One way of capturing the notion of resourcefulness is to think about the effects of newly imposed constraints on human behavior. These constraints might be new operating policies in a corporation or new laws imposed by governments. No matter how much experience we have with the response of people to changes in their environment, we tend to overestimate the impact of a new law or policy intended to constrain human behavior. Moreover, the constraint or law will almost always generate behavior which was never imagined by its sponsors. Why? Because of the sponsors' failure to recognize the creativity of REMMs. REMMs' response to a new constraint is to begin searching for substitutes for what is now constrained, a search that is not restricted to existing alternatives. REMMs will invent alternatives that did not previously exist.

An excellent illustration of how humans function as REMMs is the popular response to the 1974 federal imposition of a 55-mile-per-hour speed limit in all states under penalty of loss of federal transportation and highway moneys. The primary reason offered for this law was the conservation of gasoline and diesel fuel (for simplicity, we ignore the benefits associated with the smaller number of accidents that occur at slower speeds).

The major cost associated with slower driving is lost time. At a maximum speed of 55 mph instead of 70 mph, trips take longer. Those who argue that lost time is not important must recognize that an hour of time consumed is just as irreplaceable as—and generally more valuable than—the gallon of gasoline consumed. On these grounds, the law created inefficiencies, and the behavior of drivers is consistent with that conclusion. . . . People responded in REMM-like fashion to this newly imposed constraint in a number of ways. One was to reduce their automobile, bus, and truck travel, and, in some cases, to shift to travel by other means such as airplanes and trains. Another response was to defy the law by driving at speeds exceeding the 55 mph maximum. Violating the speed limit, of course, exposes offenders to potential costs in the form of fines, higher insurance rates, and possible loss of driver's licenses. This, in turn, provides incentives for REMMs to search out ways to reduce such costs. The result has been an entire new industry, and the rapid growth of an already existing one. Citizen's Band radios (CBs), which had been used primarily by truckers, suddenly became widely used by passenger car drivers and almost all truckers. . . . CB radios have been largely replaced by radar detectors that warn drivers of the presence of police radar. These devices have become so common that police have taken countermeasures, such as investing in more expensive and sophisticated radar units that are less susceptible to detection. Manufacturers of radar detectors retaliated by manufacturing increasingly sophisticated units.

The message is clear: people who drive value their time at more than [the savings in fuel costs from the lower speed limit]. When the 55 mph maximum speed limit was imposed, few would have predicted the ensuing chain of events. One seemingly modest constraint on REMMs has created a new electronic industry designed to avoid the constraint. And such behavior shows itself again and again in a variety of contexts—for example, in taxpayers' continuous search for, and discovery of, "loopholes" in income tax laws; the development of so-called clubs with private liquor stock in areas where serving liquor at public bars is prohibited; the ability of General Dynamics' CEO George Anders and his management team, when put under a lucrative incentive compensation plan tied to shareholder value, to quadruple the market value of the company even as the defense industry was facing sharp cutbacks; and the growth in the number of hotel courtesy cars and gypsy cabs in cities where taxi-cab licensing results in monopoly fares.

These examples are typical of behavior consistent with the REMM model, but not, as we shall see, with other models that prevail in the social sciences. The failure of the other models is important because the individual stands in relation to organizations as the atom is to mass. From small groups to entire societies, organizations are composed of individuals. If we are to have a science of such organizations, it will have to be founded on building blocks that capture as simply as possible the most important traits of humans. Although clearly not a complete description of human behavior, REMM is the model of human behavior that best meets this criterion.²

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2. REMM is not meant to describe the behavior of any particular individual. To do so requires more complete specification of the preferences, values, emotions, and talents of each person. Moreover, individuals respond very differently to factors such as stress, tension, and fear, and, in so doing, often violate the predictions of the REMM model. For purposes of organizational and public policy, many of these violations of REMM "cancel out" in the aggregate across large groups of people and over time—but by no means all. For a discussion of a Pain Avoidance Model (PAM) that complements REMM by accommodating systematically non-rational behavior, see Michael C. Jensen, "Economics, Organizations, and Non-Rational Behavior," *Economic Inquiry* (1995).

Notes and Questions

1. The Self-Interest Assumption and the Critics' "Straw Man": Economics is often criticized based on the mistaken impression that economists assume that economic decision-makers are only interested in money. To the contrary, economists recognize that individuals gain utility from any variety of activities and any number of sources—not just money. People enjoy looking at art, obtain satisfaction from their jobs over and above the salaries they earn, and feel good when helping others. Clearly, properly understood, the self-interest assumption does not mean that individuals are cold, "Dickensian" Scrooges, totally selfish and uncaring in their choices.

2. Transitive Preferences: An important assumption about economic behavior is that economic actors' preferences are transitive (that is, if A is preferred to B, and B is preferred to C, then A is preferred to C), at least over short periods of time. Suppose a woman goes into a restaurant and is informed that the only three entrees are chicken, lobster, and steak. She orders chicken, but the waiter returns and tells her that they are out of chicken. She replies, "I'll settle for the lobster." However, the waiter returns again and says, "I made a mistake, it turns out that we do have chicken after all. Would you prefer chicken instead of lobster?" To which she replies: "No, I'd like the steak." Such behavior violates the transitive preferences assumption.

3. Uncertainty and Risk Aversion: Individuals often make decisions when they are not certain of the outcome. Such uncertainty introduces risk into the decision making process. Economists assume that most individuals are risk averse. When given a choice between a certain value, say \$1,000, and an uncertain outcome of a coin toss—heads you win \$2,000, and tails you get \$0—a risk averse individual will prefer the certain amount even if the expected payoff from the coin toss is also \$1,000. [The expected value of the coin toss is the weighted average of the possible payoffs. So, in this example, the expected value is $(.5 \times \$2,000) + (.5 \times \$0) = \$1,000.00$.] The concept of risk aversion is the basis for many important insights in economics, finance, and law. Chapter VI, "Risk," explores this important assumption about economic decision making in great detail.

4. Beware of Unintended Consequences: Many laws and regulations are intended to correct perceived problems with the market allocation of goods and services. It is important in designing laws and regulations to consider how rational economic actors are likely to respond to new constraints on their behavior. Consider, for example, the Superfund requirement that contaminated soil at toxic waste sites be sterilized. This requirement means that companies looking for new industrial sites steer away from Superfund sites for fear of being held liable for cleaning up someone else's pollution (the Superfund law calls for joint and several liability of anyone who has ever owned the site). As a result, companies tend to locate in areas where the soil is not contaminated, and we end up with two dirty lots instead of one. "Brownfield" is the name that has been given to this unintended but totally predictable result.

5. Bounded Rationality: The assumption that individuals are rational maximizers is, of course, an oversimplification. We don't always seek to maximize our utility, and we all certainly have our irrational moments. But that is the idea of a model—it is a simplified version of reality that generates predictions about behavior. The validity of a model is determined by the accuracy of its predictions—on which the economic model does extremely well. The fact that individuals sometimes act irrationally merely adds noise to the model, so long as the irrational behavior is essentially random. But if the irrationality is systematic, such that individuals consistently behave in a particular (non-rational) way, it may be possible to develop a model that generates better predictions about behavior.

Footnote 5 to the Jensen and Meckling article describes one attempted model of non-rational behavior, what Jensen calls the Pain Avoidance Model. The growing field of behavioral law and economics is a broader attempt to identify such systematic irrationalities, which may result in predictions that differ from the more traditional law-and-economics model. Cass Sunstein provides some highlights:

The idea of bounded rationality includes several different points. The first involves the kind of cognitive errors that can come from biases in judgment and from efforts to economize on decision costs (“heuristics”). Biases fall in various categories; they include hindsight bias, optimistic bias, and extremeness aversion. Efforts to economize on decision costs are responsible for *rules of thumb*, or heuristics. Rules of thumb—as in the process of deciding on appropriate numbers (for many things, including real estate prices or pain-and-suffering awards) by choosing an “anchor” and then making adjustments—reduce the costs of making decisions, but they may not be fully rational. . . .

A second form of bounded rationality comes from *framing effects*. People’s reaction to a choice may depend on how it is described; hence identical, but differently worded, problems can elicit quite different responses. Consider clients deciding whether to settle or to go to trial. If they are told that, of 100 litigants, 90 who go to trial win, they may be far more likely to go to trial than if they are told that of 100 litigants, 10 who go to trial lose. . . .

Some aspects of bounded rationality are modeled by *prospect theory*, which is intended as a more accurate description of behavior than expected utility theory. For purposes of law, the first key feature of prospect theory, departing from expected utility theory, is that people are *loss averse*, that is, they dislike losses more than they like corresponding gains. . . . The second key finding is that people care a great deal about *certainty* (thus people would prefer a reduction of risk from 0.1 to 0.0 to a reduction of 0.3 to 0.1). . . . An important implication is that people are risk seeking for losses (they would choose an 80% chance to lose \$4,000 over a certain loss of \$3,000) and risk averse for gains (they would prefer a certain gain of \$3,000 over an 80% chance to gain \$4,500).

Cass R. Sunstein, *Behavioral Law and Economics: A Progress Report*, 1 American Law & Economics Review 115, 123–24 (1999).

Most of the research to date on behavioral law and economics is based on experiments, which obviously raises questions about how well the experimental results transfer to the real world. Judge Richard Posner identifies an important limitation of experimental research:

Selection effects suggest that the experimental and real-world environments will differ systematically. The experimental subjects are chosen more or less randomly; but people are not randomly sorted to jobs and other activities. People who cannot calculate probabilities will either avoid gambling, if they know their cognitive weakness, or, if they do not, will soon be wiped out and thus be forced to discontinue gambling. People who are unusually “fair” will avoid (or, again, be forced out of) roughhouse activities—including highly competitive businesses, trial lawyering, and the academic rat race. Hyperbolic discounters will avoid the financial services industry. These selection effects will not work perfectly, but they are likely to drive a big wedge between experimental and real-world consequences of irrationality.

Richard A. Posner, *Rational Choice, Behavioral Economics, and the Law*, 50 Stanford Law Review 1551, 1570–71 (1998). In essence, Posner’s argument is that markets will correct

for much of the non-rational behavior that individuals may exhibit, even if it is systematic rather than random. As a result, the traditional law-and-economics model is far from being supplanted.

3. Assumptions about Firm Behavior

A corollary of the self-interest assumption for individual behavior is the assumption that business firms attempt to maximize economic profit. Economic profit is defined as the total revenues received from selling a product or service *minus* the total costs of producing the product or service, including the opportunity costs.

Matsushita Elec. Indus. Co. v. Zenith Radio Corp.

Supreme Court of the United States

475 U.S. 574 (1986)

POWELL, J.

* * *

Petitioners, defendants below, are 21 corporations that manufacture or sell “consumer electronic products” (CEPs)—for the most part, television sets. Petitioners include both Japanese manufacturers of CEPs and American firms, controlled by Japanese parents, that sell the Japanese-manufactured products. Respondents, plaintiffs below, are Zenith Radio Corporation (Zenith) and National Union Electric Corporation (NUE). Zenith is an American firm that manufactures and sells television sets. NUE is the corporate successor to Emerson Radio Company, an American firm that manufactured and sold television sets until 1970, when it withdrew from the market after sustaining substantial losses. Zenith and NUE began this lawsuit in 1974, claiming that petitioners had illegally conspired to drive American firms from the American CEP market. According to respondents, the gist of this conspiracy was a “scheme to raise, fix and maintain artificially *high* prices for television receivers sold by [petitioners] in Japan and, at the same time, to fix and maintain *low* prices for television receivers exported to and sold in the United States.” These “low prices” were allegedly at levels that produced substantial losses for petitioners...

* * *

... The thrust of respondents’ argument is that petitioners used their monopoly profits from the Japanese market to fund a concerted campaign to price predatorily and thereby drive respondents and other American manufacturers of CEPs out of business. Once successful, according to respondents, petitioners would cartelize the American CEP market, restricting output and raising prices above the level that fair competition would produce. The resulting monopoly profits, respondents contend, would more than compensate petitioners for the losses they incurred through years of pricing below market level.

* * *

... According to petitioners, the alleged conspiracy is one that is economically irrational and practically infeasible. Consequently, petitioners contend, they had no motive to engage in the alleged predatory pricing conspiracy; indeed, they had a strong motive not to conspire in the manner respondents allege. Petitioners argue that, in light of the absence of any apparent motive and the ambiguous nature of the evidence of conspiracy, no trier of fact reasonably could find that the conspiracy with which petitioners are charged actually existed. This argument requires us to consider the nature of the alleged conspiracy and the practical obstacles to its implementation.

IV
A

A predatory pricing conspiracy is by nature speculative. Any agreement to price below the competitive level requires the conspirators to forgo profits that free competition would offer them. The forgone profits may be considered an investment in the future. For the investment to be rational, the conspirators must have a reasonable expectation of recovering, in the form of later monopoly profits, more than the losses suffered. As then-Professor Bork, discussing predatory pricing by a single firm, explained:

“Any realistic theory of predation recognizes that the predator as well as his victims will incur losses during the fighting, but such a theory supposes it may be a rational calculation for the predator to view the losses as an investment in future monopoly profits (where rivals are to be killed) or in future undisturbed profits (where rivals are to be disciplined). The future flow of profits, appropriately discounted, must then exceed the present size of the losses.” R. Bork, *The Antitrust Paradox* 145 (1978).

As this explanation shows, the success of such schemes is inherently uncertain: the short-run loss is definite, but the long-run gain depends on successfully neutralizing the competition. Moreover, it is not enough simply to achieve monopoly power, as monopoly pricing may breed quick entry by new competitors eager to share in the excess profits. The success of any predatory scheme depends on *maintaining* monopoly power for long enough both to recoup the predator’s losses and to harvest some additional gain. Absent some assurance that the hoped-for monopoly will materialize, *and* that it can be sustained for a significant period of time, “[the] predator must make a substantial investment with no assurance that it will pay off.” For this reason, there is a consensus among commentators that predatory pricing schemes are rarely tried, and even more rarely successful.

These observations apply even to predatory pricing by a *single firm* seeking monopoly power. In this case, respondents allege that a large number of firms have conspired over a period of many years to charge below-market prices in order to stifle competition. Such a conspiracy is incalculably more difficult to execute than an analogous plan undertaken by a single predator. The conspirators must allocate the losses to be sustained during the conspiracy’s operation, and must also allocate any gains to be realized from its success. Precisely because success is speculative and depends on a willingness to endure losses for an indefinite period, each conspirator has a strong incentive to cheat, letting its partners suffer the losses necessary to destroy the competition while sharing in any gains if the conspiracy succeeds. The necessary allocation is therefore difficult to accomplish. Yet if conspirators cheat to any substantial extent, the conspiracy must fail, because its success depends on depressing the market price for *all* buyers of CEPs. If there are too few goods at the artificially low price to satisfy demand, the would-be victims of the conspiracy can continue to sell at the “real” market price, and the conspirators suffer losses to little purpose.

Finally, if predatory pricing conspiracies are generally unlikely to occur, they are especially so where, as here, the prospects of attaining monopoly power seem slight. In order to recoup their losses, petitioners must obtain enough market power to set higher than competitive prices, and then must sustain those prices long enough to earn in excess profits what they earlier gave up in below-cost prices. Two decades after their conspiracy is alleged to have commenced, petitioners appear to be far from achieving this goal: the two largest shares of the retail market in television sets are held by RCA and respondent Zenith, not by any of petitioners. Moreover, those shares, which together approximate 40% of sales, did not decline appreciably during the 1970’s. Petitioners’ collective share

rose rapidly during this period, from one-fifth or less of the relevant markets to close to 50%. Neither the District Court nor the Court of Appeals found, however, that petitioners' share presently allows them to charge monopoly prices; to the contrary, respondents contend that the conspiracy is ongoing—that petitioners are still artificially *depressing* the market price in order to drive Zenith out of the market. The data in the record strongly suggest that goal is yet far distant.³

The alleged conspiracy's failure to achieve its ends in the two decades of its asserted operation is strong evidence that the conspiracy does not in fact exist. Since the losses in such a conspiracy accrue before the gains, they must be "repaid" with interest. And because the alleged losses have accrued over the course of two decades, the conspirators could well require a correspondingly long time to recoup. Maintaining supra competitive prices in turn depends on the continued cooperation of the conspirators, on the inability of other would-be competitors to enter the market, and (not incidentally) on the conspirators' ability to escape antitrust liability for their *minimum* price-fixing cartel. Each of these factors weighs more heavily as the time needed to recoup losses grows. If the losses have been substantial—as would likely be necessary in order to drive out the competition—petitioners would most likely have to sustain their cartel for years simply to break even.

Nor does the possibility that petitioners have obtained supra competitive profits in the Japanese market change this calculation. Whether or not petitioners have the means to sustain substantial losses in this country over a long period of time, they have no motive to sustain such losses absent some strong likelihood that the alleged conspiracy in this country will eventually pay off. The courts below found no evidence of any such success, and—as indicated above—the facts actually are to the contrary: RCA and Zenith, not any of the petitioners, continue to hold the largest share of the American retail market in color television sets. More important, there is nothing to suggest any relationship between petitioners' profits in Japan and the amount petitioners could expect to gain from a conspiracy to monopolize the American market. In the absence of any such evidence, the possible existence of supra competitive profits in Japan simply cannot overcome the economic obstacles to the ultimate success of this alleged predatory conspiracy.

* * *

... [P]etitioners had no motive to enter into the alleged conspiracy. To the contrary, as presumably rational businesses, petitioners had every incentive not to engage in the conduct with which they are charged, for its likely effect would be to generate losses for petitioners with no corresponding gains....

3. Respondents offer no reason to suppose that entry into the relevant market is especially difficult, yet without barriers to entry it would presumably be impossible to maintain supra competitive prices for an extended time. Judge Easterbrook, commenting on this case in a law review article, offers the following sensible assessment:

... There are no barriers to entry into electronics, as the proliferation of computer and audio firms shows. The competition would come from resurgent United States firms, from other foreign firms (Korea and many other nations make TV sets), and from defendants themselves. In order to recoup, the Japanese firms would need to suppress competition among themselves. On plaintiffs' theory, the cartel would need to last at least thirty years, far longer than any in history, even when cartels were not illegal. None should be sanguine about the prospects of such a cartel, given each firm's incentive to shave price and expand its share of sales. The predation recoupment story therefore does not make sense, and we are left with the more plausible inference that the Japanese firms did not sell below cost in the first place. They were just engaged in hard competition.

Easterbrook, *The Limits of Antitrust*, 63 *Texas L. Rev.* 1, 26–27 (1984) (footnotes omitted).

* * *

... [T]he absence of any plausible motive to engage in the conduct charged is highly relevant to whether a “genuine issue for trial” exists within the meaning of Rule 56(e). Lack of motive bears on the range of permissible conclusions that might be drawn from ambiguous evidence: if petitioners had no rational economic motive to conspire, and if their conduct is consistent with other, equally plausible explanations, the conduct does not give rise to an inference of conspiracy.... Here, the conduct in question consists largely of (i) pricing at levels that succeeded in taking business away from respondents, and (ii) arrangements that may have limited petitioners’ ability to compete with each other (and thus kept prices from going even lower). This conduct suggests either that petitioners behaved competitively, or that petitioners conspired to *raise* prices. Neither possibility is consistent with an agreement among 21 companies to price below market levels. Moreover, the predatory pricing scheme that this conduct is said to prove is one that makes no practical sense: it calls for petitioners to destroy companies larger and better established than themselves, a goal that remains far distant more than two decades after the conspiracy’s birth. Even had they succeeded in obtaining their monopoly, there is nothing in the record to suggest that they could recover the losses they would need to sustain along the way. In sum, in light of the absence of any rational motive to conspire, neither petitioners’ pricing practices, nor their conduct in the Japanese market, nor their agreements respecting prices and distribution in the American market, suffice to create a “genuine issue for trial.”

* * *

The decision of the Court of Appeals is reversed, and the case is remanded for further proceedings consistent with this opinion.

It is so ordered.

Notes and Questions

1. Rationality and Profit Maximization: The Court assumes the Japanese firms behaved rationally by selecting profit maximizing strategies. The plaintiffs’ theory, in contrast, required irrational behavior by the Japanese manufacturers. Thus, the Court rejected the plaintiffs’ theory as being inconsistent with standard assumptions about economic behavior.

2. Managerial Incentives: The Court implicitly assumes that profit maximization is the goal of the firm, but firms are managed by individuals whose incentives may not always be aligned with this goal. Managers may be more interested in increasing their salary or the size of the firm than in maximizing profits. This divergence between managers’ incentives and the firm’s profit maximization goal is an example of the **principal-agent problem**. Managers, who are agents of the firm’s owners (the principals), do not always act in their principals’ best interest. For corporations with publicly traded shares and dispersed shareholders, the principal-agent problem is often characterized as the result of a “separation of ownership and control.”

3. Profits and Cartel Agreements: The Court recognizes that each Japanese firm, as a profit maximizer, would have incentives to cheat on the cartel agreement both before and after any success in dominating the market. Again, the assumption of profit maximizing behavior strained the credibility of the plaintiffs’ theory.

4. Opportunity Cost of Profits Earned in Japan: The plaintiffs argue that the profits earned in Japan and then, allegedly, used to subsidize losses in the United States, are

somehow not as valuable as other profits—herein lies the incentive to accept the present lost profits in hope of greater future profits from exploiting American consumers. But that cross-subsidization argument ignores the fundamental economic concept of opportunity cost. Profits are profits, regardless of their source. In deciding what to do with those profits—whether to use them to finance continued losses in the American market or to put them to some other use—the Japanese manufacturers necessarily will consider the next best alternative use of those profits, i.e., the opportunity cost. Conversely, the losses the manufacturers suffered in the American market are not lessened in any way by the fact that they were making profits in Japan. As a result, that the manufacturers are making large profits in Japan does not make it any more rational for them to incur ongoing losses in a predatory pricing scheme in the United States than if they had to look to other sources of financing to cover their American losses.

5. Costs of Production and Economic Profit: Profit is defined as total revenue minus total costs. Economists use the phrase **costs of production** in a way that reflects the concept of opportunity cost. In order for a firm to undertake a productive activity, it must attract inputs (resources or factors of production) from other alternative uses. The firm attracts inputs by paying the owners of the inputs at least the value of their services in their next best alternative use—opportunity cost. Costs of production (firm outlays) are the payments made to the owners of resources to assure the availability of those resources for use in the firm's production process. In discussing the costs of production, economists and many courts are careful to recognize both the **explicit costs** recorded in the firm's books and the **implicit costs** that reflect the value of resources used in production by the firm for which no explicit payments are made. When a firm does not make an explicit payment for the use of resources it owns, then the implicit cost is the income that those resources could have commanded in some alternative use. A consideration of explicit and implicit costs reveals the total opportunity cost of the production process.

Consider, for example, a small "Mom & Pop" tavern organized as a sole proprietorship and located on a busy corner of an area undergoing a commercial "boom." "Mom & Pop" own the building in which the tavern is located. Their explicit costs of operation include the payments for inventory, advertising, legal and accounting services, and labor. Each of these payments involves an explicit contractual outlay that is recorded as a cost in the firm's books. On the other hand, "Mom & Pop" may leave out some important implicit costs of production. For example, "Mom & Pop" may not record on the firm books a salary for their own services. Or, they may enter a salary below what they could earn while working for another firm. The opportunity cost of working for themselves is an implicit cost—a real economic cost—that should be relevant in their decision making process. Another implicit cost that may be left out of "Mom & Pop's" accounting records is the opportunity cost of using their building. If "Mom & Pop" did not occupy the building, it could be rented to another business or sold (with the proceeds invested in another income earning asset). The failure to include the implicit cost of using the building means that the firm is ignoring an important opportunity cost: the **opportunity cost of capital**—the value of the payments that they could receive from the next best alternative investment of the capital tied up in the firm. The opportunity cost of capital is typically assumed to be the market rate of return on an asset of similar risk, and is an implicit cost of production.

Including implicit costs as well as explicit costs in the cost calculation lets one determine **economic profit**—the difference between total revenue and total cost of production. In contrast, the **accounting profit** found on a firm's income statement is the amount by which total revenue exceeds total explicit costs. Obviously, if accounting costs do not

account for implicit costs, then accounting profit may overstate actual (economic) profit. In other words, positive accounting profit does not necessarily imply that positive economic profit is being earned. To the contrary, a positive accounting profit can be consistent with an economic loss.

A final, related point about a firm's cost of production concerns the accounting convention of relying on **historical costs**, i.e., payments that were incurred in the past. Historical cost means that the accounting value of an asset—such as inventory or a building—is determined by the price that the firm paid for the asset. This is the exact opposite of the perspective inherent in the concept of opportunity cost. Opportunity cost is forward-looking—it involves a decision today to commit resources to one use as opposed to another use. Thus, in a real sense, opportunity cost is the value of “the road not taken.” Decisions by economic actors rely on predictions about the future, not on past events. Past outlays (unless they affect prospective costs) are not costs because they exert no influence on current decisions.

Consider, for example, the market value today of a commercial building purchased in 1995 for \$1,000,000. If the market price of the building has fallen to \$500,000, should the owner refuse to sell at that price simply because its current **book value** (historical cost minus accumulated depreciation) is \$800,000? Alternatively, if the owner of the building tried to use it as collateral for a bank loan, would the banker use historical value or current market value as an indicator of its value as collateral? The prudent banker will look at the market value.

6. Economic Survival of the Fittest: What if businesses did not seek to maximize profits, but instead made business decisions for no apparent reason and changed their strategies entirely at random? Wouldn't the most successful businesses still be those that (however randomly) chose strategies that were the most profitable? And wouldn't businesses that chose unprofitable strategies lose money and eventually go out of business? Thus, even if businesses do not consciously follow a profit maximization strategy, the results of marketplace competition will look much as if they did—the economic fittest will survive. This process is often referred to as **Economic Darwinism**. James Brickley, Clifford Smith, and Jerold Zimmerman apply this perspective to competition among firms: “The collapse of Enron, Charles Darwin might have noted, is an example of how competition tends to weed out the less fit. As described in *The Origin of Species*, natural history illustrates the principle of ‘survival of the fittest.’ In industry, we see Economic Darwinism in operation as competition weeds out ill-designed organizations that fail to adapt. Competition in the market provides strong pressures for efficient decisions. Competition among firms dictates that only those firms with low costs will survive. If firms adopt inefficient, high-cost policies, competition will place strong pressures on these firms to either adapt or close.” James Brickley et al., *Managerial Economics and Organizational Architecture* 7 (3rd ed. 2004).

B. Property Rights and Exchange in a Free Market Economy

The fundamental problem faced by any economic system is the allocation of society's scarce resources among the unlimited desires of the individuals who make up that society. A **capitalistic market economy**, which is the basis of the American economic system, attempts to solve this social problem by tapping the individual's self-interest in a manner

that encourages him or her to put resources to their most highly valued use. Scarce resources — i.e., resources that have an opportunity cost — are combined by individuals or firms to produce economic goods and services which are desired by other economic actors. In the American economic system, economic goods and services are allocated primarily through the market system. The willingness and ability of individuals to trade-off the alternative uses of the resources at their command determine who receives the goods and services.

A **property right** is a socially enforced right to determine and control the use of an economic good. A property right is private when it is assigned to a specific person. Property rights are alienable in that they can be transferred (sold or given) to other individuals. The ownership of private property rights is the foundation of a free market economy. Owners of land and other resources have the legal rights to decide how to use these resources and frequently trade their rights to other individuals. They are free to start new businesses and to close existing businesses. In contrast, in centrally planned economies, property tends to be owned by the state; government officials decide how to use these resources. In a system of private property, the individual (as opposed to the government) holds the right to control property. The individual receives the benefit and must pay the costs associated with the use of the property. In a capitalist society, the law protects property rights. Without some guarantee that property rights will be protected, there would be little incentive to accumulate capital stock and, therefore, to grow economically. Without state guarantees of rights to property, individuals would have to protect their own property at a high personal cost.

The economics of property rights has received a great deal of attention with the development of law and economics. A simple example of ownership of a pasture is used to illustrate some of the important insights. If Sarah owns a pasture, she can forbid others from grazing their cattle on it — and, importantly, there is no need for her to negotiate an agreement for exclusive use.

1. An Overview of the Efficient Property Rights System

Legal protection of property rights is important because it creates incentives to use resources efficiently. A truly efficient system of property rights requires three attributes: (1) universality — every resource is owned; (2) exclusivity — the owner of property may exclude all others from using it; and (3) transferability — it is costless for possessors of property rights to exchange their rights. A property rights system with these attributes, when combined with a free market economy, will generate the efficient allocation of resources. The legal system and property law, however, do not always fulfill these criteria.

In general, the granting of property rights confers two types of economic benefits, static and dynamic. Static refers to the impact of the property right on behavior during one particular time period — for example, one year or one growing season. The static benefit is illustrated by considering alternative assignments of property rights to a natural, uncultivated pasture. If the property rights are attenuated — that is, not exclusive or fully enforceable — so that Sarah can't exclude others from using her pasture (or cannot secure compensation when others use the pasture without her permission), then the property will not be used in a value maximizing manner because some (or, perhaps, all) users of the pasture will ignore the costs they impose on other users in deciding how much to let their cattle graze in the pasture. The use of the pasture by the trespassers imposes a cost on Sarah, and also biases the use of the pasture towards overgrazing. The overgrazing results in reduced total weight for cattle because the owners of the cattle allow their cattle

to expend more energy in finding enough to eat than they would expend if each cattle owner had to pay the full cost of the grass, which is the case when the cattle owner has exclusive use of his own pasture. The attenuated property rights—even in the static situation—result in an outcome that is clearly not optimal. However, granting enforceable property rights to Sarah will result in the static benefit of preventing overgrazing.

The dynamic benefit of a property right is the incentive to invest in the creation or improvement of some resource over time. For example, if Sarah is guaranteed exclusive rights to the pasture in both period 1 and period 2, then she has the incentive to invest resources (for example, through fertilization and careful management to avoid overgrazing) in period 1. She can then reap the benefits of the investment in period 2. Sarah would be unwilling to make such an investment if she were not able to exclude other potential users of the pasture in period 2. Similarly, a business firm is less likely to invest resources on the research and development of a new product if competing firms that have not borne that expense can duplicate it without having to compensate the original firm. As a result, when property rights are not enforceable, the initial investment is less likely to occur or, if it is forthcoming, it is likely to be smaller than with enforceable property rights. Thus, attenuated (poorly defined) property rights prevent the achievement of the optimal outcome in the dynamic setting as well as the static setting.

The transferability of property rights facilitates the maximization of the static and dynamic benefits of well-defined property rights. In the preceding example, one would expect the cattle owners to attempt to capture the static and dynamic benefits of private property by negotiating a set of exclusive use property rights among themselves, provided their numbers are small enough for negotiation to occur (that is, provided that transaction costs are less than the gains from the transaction).

Costless transfer of property rights assures that the property rights are allocated to the highest valued uses. For example, if Sarah (the owner of the pasture) is a relatively unproductive rancher, then she should be able to increase her wealth by selling the pasture to a more productive rancher at a price that reflects some portion of the increased value of the pasture in the hands of the more productive rancher.

The allocation and use of property rights is affected by **transaction costs**—the costs of acquiring information about alternative uses and of negotiating and enforcing contracts. In general, if the potential benefits of a transaction are greater than the costs of reaching and enforcing a bargain, then a voluntary, mutually-beneficial exchange will result in the property rights being controlled by the parties that value them the most. Private property rights tend to be more carefully defined, more fully allocated, and better enforced when transaction costs are relatively low or benefits of defining rights are relatively high, other things being equal.

2. Enforcement of Property Rights

An important distinction in the economic analysis of property rights concerns the type of legal rule that protects the rights. A **property rule** is a legal rule that protects a property right through the absolute right to exclude others, such as with an injunction. In the preceding example, Sarah's property right is protected by a property rule—she has the absolute right to exclude others from her property. Of course, she is allowed to reach voluntary agreements that allow others to use the property in return for some type of compensation.

Another way to protect Sarah's property right is with a **liability rule** under which Sarah has the right to collect damages from anyone who uses the pasture without her permission. Whereas a property rule requires that bargaining occur before others use the property, a liability rule allows the other party to use the property and then pay damages. Property rules require voluntary exchanges, while liability rules result in forced exchanges. Thus, liability rules are the domain of tort law, since it is impossible to negotiate a tort prior to its occurrence. For example, a driver that might cause a tortious car accident could not possibly negotiate with every other potential driver before getting in his car. Much of the economic analysis of law has been concerned with identifying situations where one rule is more appropriate than the other.

Property Rules, Liability Rules, and Inalienability: One View of the Cathedral

Guido Calabresi & A. Douglas Melamed

85 Harvard Law Review 1089, 1092–93, 1105–06 (1972)

Only rarely are Property and Torts approached from a unified perspective. Recent writings by lawyers concerned with economics and by economists concerned with law suggest, however, that an attempt at integrating the various legal relationships treated by these subjects would be useful both for the beginning student and the sophisticated scholar. By articulating a concept of "entitlements" which are protected by property, liability, or inalienability rules, we present one framework for such an approach...

* * *

An entitlement is protected by a property rule to the extent that someone who wishes to remove the entitlement from its holder must buy it from him in a voluntary transaction in which the value of the entitlement is agreed upon by the seller...

Whenever someone may destroy the entitlement if he is willing to pay an objectively determined value for it, the entitlement is protected by a liability rule. This value may be what it is thought the original holder of the entitlement would have sold it for. But the holder's complaint that he would have demanded more will not avail him once the objectively determined value is set.

* * *

An entitlement is inalienable to the extent that its transfer is not permitted between a willing buyer and a willing seller...

It should be clear that most entitlements to most goods are mixed. Taney's house may be protected by a property rule in situations in which Marshall wishes to purchase it, by a liability rule where the government decides to take it by eminent domain, and by a rule of inalienability in situations where Taney is drunk or incompetent...

* * *

Whenever society chooses an initial entitlement it must also determine whether to protect the entitlement by property rules, by liability rules, or by rules of inalienability. In our framework, much of what is generally called private property can be viewed as an entitlement protected by a property rule. No one can take the entitlement to private property from the holder unless the holder sells it willingly and at the price at which he subjectively values the property. Yet a nuisance with sufficient public utility to avoid an injunction has, in effect, the right to take property with compensation. In such a circumstance the entitlement to the property is protected only by what we call a liability

rule: an external, objective standard of value used to facilitate the transfer of the entitlement from the holder to the nuisance. Finally, in some instances we will not allow the sale of the property at all, that is, we will occasionally make the entitlement inalienable.

* * *

Notes and Questions

1. Entitlements: Property and Liability Rules: Property rules are premised on an actual exchange between a willing seller and a buyer—in other words, a party whose property interest is protected by a property rule can refuse to sell unless the price is right. Liability rules, by contrast, are premised on a hypothetical, rather than actual, exchange. As a result, isn't all property taken subject to a liability rule undervalued because by definition there is no willing seller? That is, doesn't the person with the property before the taking value it more highly than the price set for the right under the liability rule? What public policy justifications can you think of for creating such a rule?

2. Entitlements and Inalienability: What incentive does inalienability have on creating wealth? Is alienability only paternalistic in scope or is there another purpose behind the doctrine?

3. Why the Distinction?: Why is there this distinction between property and liability rules and inalienability? Is it merely semantics? Or are there different policy reasons that affect the implementation and enforcement of these doctrines?

3. Poorly Defined Property Rights

Some resources, like air and water, are not privately owned. Because of the common ownership of these resources, no one has adequate legal rights to protect against their use. Thus, economic actors are able to use such resources without paying for them. For example, pollution occurs because manufacturers are able to avoid paying the cost of the damage to the air. Such externalities would not occur, or at least people would have to pay for them (that is, internalize them), if the three attributes of an efficient property rights system were satisfied.

Common ownership means that the property rights to a resource are nonexistent or poorly defined. As a result, anyone may use or consume the resource. Common ownership often destroys the static and dynamic benefits of private ownership. The fundamental economic disadvantage of common ownership is the absence of any incentive to invest in the productivity of the common property. Rather, each person with access to the resource has an incentive to exploit it and neglect the effects of his or her actions on the resource's productivity.

The Tragedy of the Commons

Garrett Hardin

162 Science 1243, 1244–45 (1968)

The tragedy of the commons develops this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons.... At this point, the inherent logic of the commons remorselessly generates tragedy.

As a rational being, each herdsman seeks to maximize his gains. Explicitly or implicitly, more or less consciously, he asks, “What is the utility to me of adding one more animal to my herd?” This utility has one negative and one positive component.

1. The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.

2. The negative component is a function of the additional overgrazing created by one animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of -1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him is to add another animal to his herd. And another; and another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.

* * *

Notes and Questions

1. *Tragedy Everywhere:* The Tragedy of the Commons has been used for hundreds of years (at least since Reverend C.L. Dodgson—a.k.a. Lewis Carroll—first introduced collective action analysis) to explain why mankind cannot achieve total economic prosperity. That is, rational self-interested people have limits as to how far they can progress without controls and laws to shape the overall economy. What laws and reforms are centered around this argument?

2. *Congress, Businesses, and Law Schools:* The U.S. Congress is arguably the most expensive example of a tragedy of the commons. Because of the pressure to get reelected, Senators and Representatives try to pass legislation to benefit their constituents, without regard to the whole country. Vote trading and logrolling result in numerous pork barrel projects that would not pass if evaluated on an individual basis. Other economic organizations—such as businesses and law schools—are not exempt from this tragedy either. Can you think of examples where one person has rationally pursued his or her self-interest only to hurt, directly or otherwise, the common interests?

The following case illustrates how the Tragedy of the Commons impacts oil and gas extraction.

Wronski v. Sun Oil Co.

Michigan Court of Appeals
279 N.W.2d 564 (1979)

HOLBROOK, J.

[Plaintiffs own several tracts of land comprising 200 acres within the Columbus 3 oil pool. Defendant Sun Oil has drilled several wells on nearby property. The Supervisor of Wells, Michigan Department of Natural Resources, issued an order, under the authority of the Michigan oil and gas conservation act, establishing 20-acre well drilling units for the Columbus 3 pool; this order limits the number of wells that may be drilled to one

well for each designated 20-acre tract within the boundaries of this oil field. The Supervisor also issued an order which limited production from each well within the field to a maximum of 75 barrels of oil per day. Plaintiffs contend that Sun Oil illegally overproduced oil from three wells and that such oil was drained from beneath the plaintiffs' tracts. The trial court found that Sun Oil had intentionally and unlawfully produced 150,000 barrels of oil, and that 50,000 barrels had been drained from beneath plaintiffs' property. The court awarded compensatory and exemplary damages to the plaintiffs. Sun Oil appealed.]

* * *

Oil and gas, unlike other minerals, do not remain constantly in place in the ground, but may migrate across property lines. Because of this migratory tendency the rule of capture evolved. This rule provides:

The owner of a tract of land acquires title to the oil and gas which he produces from wells drilled thereon, though it may be proved that part of such oil or gas migrated from adjoining lands. Under this rule, *absent some state regulation of drilling practices*, a landowner . . . is not liable to adjacent landowners whose lands are drained as a result of such operations. . . . The remedy of the injured landowner under such circumstances has generally been said to be that of self-help "go and do likewise."

This rule of capture was a harsh rule that could work to deprive an owner of oil and gas underneath his land. To mitigate the harshness of this rule and to protect the landowners' property rights in the oil and gas beneath his land, the "fair share" principle emerged[:]

* * *

Within reasonable limits, each operator should have an opportunity equal to that afforded other operators to recover the equivalent of the amount of recoverable oil (and gas) underlying his property. The aim should be to prevent reasonably avoidable drainage of oil and gas across property lines that is not offset by counter drainage.

This fair-share rule does not do away with the rule of capture, but rather acts to place limits on its proper application.

* * *

Michigan recognizes the fair-share principle and its subsequent modifications of the rule of capture. . . . This right to have a reasonable opportunity to produce one's just and equitable share of oil in a pool is the common-law right that the trial court found Sun Oil violated. [I]f it can be said that Sun Oil's overproduction deprived plaintiffs of the opportunity to claim and take the oil under their respective properties, then Sun Oil will be liable for a conversion.

Production in the Columbus 3 field was restricted to 75 barrels of oil per well per day. Compulsory pooling was also in effect, limiting the number of oil wells to one per twenty acres, and specifying their location. The purpose behind proration is that the order itself, if obeyed, will protect landowners from drainage and allow each to produce their fair share. A violation of the proration order, especially a secret violation, allows the violator to take more than his fair share and leaves the other landowners unable to protect their rights unless they also violate the proration order. We therefore hold that any violation of a proration order constitutes conversion of oil from the pool, and subjects the violator to liability to all the owners of interests in the pool for conversion of the illegally-obtained oil. The trial court found that Sun Oil produced 150,000 barrels of oil from the Columbus 3 pool in contravention of the order of the Supervisor of Wells, and that 50,000 barrels

of this oil had been drained from the lands of plaintiffs, which the trial court identified as a violation of the plaintiffs' common-law rights. The finding that Sun Oil is liable to plaintiffs for the conversion of 50,000 barrels of oil is affirmed.

Notes and Questions

1. Fishing: The Tragedy of the Commons argument applies to both renewable resources, such as fish, and nonrenewable resources, such as oil. Consider the example of fishing in international waters. In international waters, anyone may acquire exclusive ownership of fish by catching them, and no one has rights to the fish until they are caught. This system causes each fisherman to ignore the effect of the well-known biological law that the current stock of a species of fish determines its reproductive life. Thus, the fish harvested today reduce today's stock and thereby affect the size of tomorrow's stock and tomorrow's harvesting costs and revenues. However, overfishing results because no single fisherman has an incentive to act on this bioeconomic relationship. If all fishermen would cooperate to restrain themselves today, tomorrow's stock would be larger and future harvesting cheaper and more profitable. However, under competitive conditions, each individual knows that if he or she abstains now, rivals will not abstain and much of the effect of one individual's abstention will be lost. Further, the reduction in future costs would accrue to everyone, not just to the abstainer. Hence, each person has little reason to abstain since the major effect is to lower others' future costs at the immediate present cost to the abstainer.

2. Three Solutions to Overfishing: (1) *A Single Owner:* Individual ownership removes this dilemma. If only one person is fishing, he or she need not worry that rivals will not abstain. (Of course, groups such as tribes of indigenous people can also be sole owners, but the group must be able to control the behavior of its members with respect to the resource.) (2) *Contracting Among Multiple Owners:* When there is more than one owner, all parties involved could negotiate an agreement to abstain and all would benefit. The fact that such agreements are not usually successful in negotiations is due to the cost of dealing with all current and potential people who will fish and the difficulty in ensuring that all abstain as agreed. (3) *Government Regulation:* A third method of dealing with the Tragedy of the Commons in international fishing is government regulation. Such regulation usually sets an annual catch quota. To allocate the quota, regulators rely on restrictions on fishing technology or simply close the season when the quota is taken. Both means create difficult enforcement problems and potential economic waste. If the season is closed when the quota is taken, for example, excess profits are dissipated in competition among fishermen to buy bigger, faster boats and thus get a larger share of the quota. The season progressively shrinks, and resources stand idle for much of the year or are devoted to inferior employment.

3. Environmental Protection and Federalism: A leading rationale for federal domination of environmental regulation is to prevent states from competing for economic growth opportunities by lowering their environmental standards in a so-called "race to the bottom." The notion is that all states compete for economic growth by lowering environmental standards below the level they would select if they acted collectively at the national level. What is individually rational for each state is collectively irrational at the national level. Professor Richard Stewart describes the implication of this dynamic in concise terms:

... Given the mobility of industry and commerce, any individual state or community may rationally decline unilaterally to adopt high environment standards that entail

substantial costs for industry and obstacles to economic development for fear that the resulting environmental gains will be more than offset by movement of capital to other areas with lower standards. If each locality reasons in the same way, all will adopt lower standards of environmental quality than they would prefer if there were some binding mechanism that enabled them simultaneously to enact higher standards, thus eliminating the threatened loss of industry or development.

Richard B. Stewart, *Pyramids of Sacrifice? Problems of Federalism in Mandating State Implementation of National Environmental Policy*, 86 Yale Law Journal 1196, 1212 (1977). Thus, according to this logic, federal regulation is necessary to correct a political market failure at the state level. For thorough documentation of the influence of this argument, as well as a devastating critique, see Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the "Race-to-the-Bottom" Rationale for Federal Environmental Regulation*, 67 New York University Law Review 1210, 1233–44 (1992).

4. Tragedy of the Anticommons: Whereas the Tragedy of the Commons describes situations in which multiple owners of property are unable to exclude each other, resulting in overuse of the property, the Tragedy of the Anticommons refers to situations in which multiple owners of property are able to exclude each other, resulting in underuse of the property. Michael Heller explains:

Socialist rule stifled markets and often left store shelves bare. One promise of the transition “from Marx to markets” was that new entrepreneurs would acquire the stores, create businesses, and fill the shelves. However, after several years of reform, storefronts often remained empty, while flimsy metal kiosks, stocked full of goods, mushroomed up on Moscow streets. Why did new merchants not come in from the cold?

* * *

[E]ven if the initial endowment of property rights were clearly defined, corruption held in check, and the rule of law respected, storefronts would remain empty because of the way governments are creating property rights. Transition regimes have often failed to endow any individual with a bundle of rights that represents full ownership of storefronts or other scarce resources. Instead, those regimes have ratified the expectations of powerful socialist-era stakeholders by making them rights-holders in the new economy. Rights were made alienable in the hope that new owners would trade them to more productive users. In a typical Moscow storefront, one owner may be endowed initially with the right to sell, another to receive sale revenue, and still others to lease, receive lease revenue, occupy, and determine use. Each owner can block the others from using the space as a storefront. No one can set up shop without collecting the consent of all of the other owners.

Empty Moscow storefronts are a stark example of anticommons property, a type of property regime that may result when initial endowments are created as disaggregated rights rather than as coherent bundles of rights in scarce resources. More generally, one can understand anticommons property as the mirror image of commons property.

* * *

Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 Harvard Law Review 621, 622–23 (1988).

How might our existing patent system be vulnerable to creating a Tragedy of the Anticommons?

4. Public Goods

A **public good** is a good where one individual's consumption of the good does not reduce or exclude the ability of other individuals to consume the good. A pure public good is both nonrival and nonexcludable. A good is nonrival when the quantity available for other people does not diminish when one consumes it. A good is nonexcludable if it is prohibitively costly to provide the good only to people who pay for it while preventing or excluding other people from obtaining it. The classic example of a public good is national defense. Once provided to one person, national defense is available to all on a noncompeting or nonrivalrous basis. It is difficult or impossible to exclude anyone from the use of the national defense public good, and its enjoyment by one person does not prevent its use by another.

In contrast, a private good is consumed exclusively by the person who owns it. If you eat an apple, one less apple remains for other people. If you watch a television show, however, your action does not reduce the number of viewers who can watch the show on their own televisions.

Public goods present a unique economic problem because firms have little incentive to produce them. Few buyers willingly pay for nonexcludable goods because they can get them free. The problem facing producers of public goods is that **free riding** behavior makes it difficult to discover the true preferences of consumers of a public good. Individuals will not reveal their true preferences for public goods because it is not in their self interest to do so. For example, your neighborhood might try to organize a crime watch group. Many neighbors might not contribute but would still appreciate any protection provided, thus concealing group preferences for the service. On the other hand, some who do contribute voluntarily might be totally disinterested in the service. Free riding makes it difficult to determine the true level of demand for the public good. The free rider problem holds the equilibrium quantity of public goods below the economically efficient quantity.

If everyone free rides and no one contributes to the production of public goods, then everyone will be worse off as a result. Although each individual would like some provision of public goods, none will be produced. Herein lies the rationale for government provision of public goods. The government has the power of coercion and taxation, and it can force consumers to contribute to the production of public goods. Citizens cannot refuse to pay taxes; they are forced to contribute to the cost of the public sector output.

Government provision of public goods has two main drawbacks. First, the government lacks information about the amount of money that various people are willing to pay for any particular public good. This creates two more problems. The government cannot calculate the economically efficient level of a public good, and accordingly it may tax some people more (and others less) than they are willing to pay for the public good. The counterargument to this objection is that the government may get closer to the economically efficient level of the public good than would emerge in the free market. The second main drawback of government provision of public goods is that the actual government program will reflect political pressures to benefit special interests rather than the provision of true public goods. That is, the political determination of what is a "public good" may stray from the economic definition of a public good. The role of defense contractors in lobbying for weapons systems illustrates the private benefits associated with the political definition of "public goods."

5. Externalities, Property Rights, and the Coase Theorem

If producing firms incur all of the costs associated with the production of their product, they are well situated to balance the marginal costs and marginal benefits of their actions. However, in many instances, some of the costs of producing a product “spill over” and injure third parties that are not part of the production process. The total cost to society in terms of resources consumed is the sum of the private costs paid by the producer and the external costs that must be borne by third parties. If the legal system does not require the producer to compensate third parties, then the producer will be able to operate at a cost of production that does not fully reflect the cost in terms of society’s resources. Thus, the consequences of self-interested behavior may not always be in the best interest of society.

Externalities exist when the actions of one party affect the utility or production possibilities of another party outside the exchange relationship. Externalities can prevent a free market from being efficient. If a firm emits pollution into the air, it can adversely affect the welfare of its surrounding neighbors. If the firm does not bear these costs, it is likely to select an inefficient level of pollution (that is, to overpollute). In choosing how much to invest in pollution control equipment, the firm will consider only its own private costs and benefits. A socially-efficient investment would also consider the costs and benefits imposed on the neighbors. Externalities are covered in detail in Chapter IV.

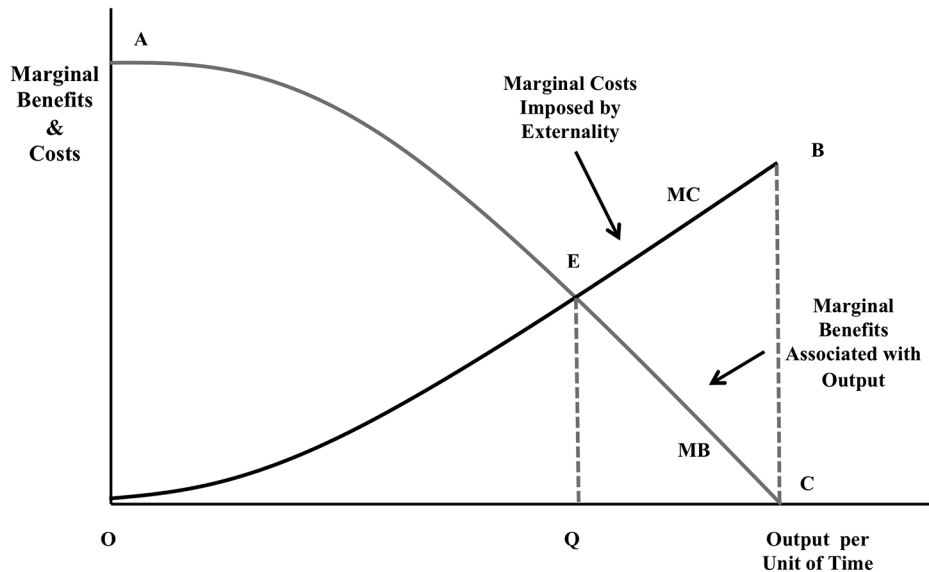
Prior to 1960, most economists thought that externalities would surely prevent a free market from producing an efficient allocation of resources. Government intervention seemed to be needed to enhance efficiency. For example, the traditional recommendation would have been to tax firms based on their levels of pollution. Given this tax, firms would have incentives to reduce pollution in order to reduce their taxes.

In 1960, Nobel Laureate Ronald Coase presented a convincing argument that free-market exchange is much more powerful in producing efficient results than many economists had thought. As long as property rights can be traded, there is an incentive to rearrange these rights to enhance economic efficiency. The often-recommended government intervention might be unnecessary and, in many cases, undesirable. Suppose that a firm has the legal right to pollute as much as it wants. The neighbors can always offer to pay the firm to reduce its pollution level. Thus, the firm faces a cost for polluting (if the firm pollutes, there is an opportunity cost of not receiving compensation from its neighbors). The firm will pollute only if the pollution generating activity is more valuable to the firm than the costs it imposes on its neighbors.

Consider a factory belching smoke over a nearby community. Figure I-1 illustrates the analysis. Firm output per unit of time is given along the horizontal axis. The marginal benefits to the firm of producing this output are given in dollar terms on the vertical axis. For the sake of this analysis, marginal benefits (MB) can be thought of as the net profits of producing additional units of output. The MB schedule, therefore, declines with increases in output because the rate of return on additional production generally declines. The marginal cost (MC) curve represents the externality caused by the firm’s production. It is also given in dollar terms along the vertical axis. The MC measures the additional costs created at each output level by additional smoke. (Assuming that the amount of smoke the firm produces is directly related to its rate of output, more production will cause more smoke.) The MC curve rises as output increases.

If the homeowners in the surrounding neighborhood own the right to clean air, and assuming that bargaining costs nothing, the factory will be able to purchase the right to pollute up to output Q , where $MB = MC$. For rates of output up to Q , the $MB > MC$ —

Figure I-1. The Coase Theorem



the firm's profits on those units are greater than the additional pollution costs borne by the neighborhood. This means that the firm would be willing to buy and the neighborhood willing to sell the right of using the air to produce those units. The total benefit of producing output Q is indicated by AEO . Since the total cost of the externality caused by this output is represented by the area under the MC curve, OEQ , a bargain can be struck between the firm and the neighborhood to produce Q by agreeing on how to divide the surplus benefit, AEO . Beyond Q , $MC > MB$. A bargain to produce these units cannot be reached between the firm and the neighborhood because the firm would not be willing to bid enough to obtain the right to produce those units. So Q , where $MB = MC$, is the equilibrium outcome when the neighborhood is given the transferable right to use the air.

Suppose that a judge decided to award the firm the right to use the air as it chooses. The same analysis indicates that the neighborhood would pay the firm to produce less output. For up to Q units of output, $MB > MC$, which means that the neighborhood will not offer a large enough sum of money to induce the firm to reduce its output and its smoke. Beyond Q , the situation has changed. The firm would be willing to accept an offer of money to reduce its output. Beyond Q , the smoke causes $EBCQ$ in damage to the neighborhood and the benefits to the firm for this output are only ECQ . The neighborhood is therefore willing to make it worthwhile to the firm to reduce pollution to the point where $MB = MC$ at Q .

This is a powerful result. No matter who has the legal right to use the air, the amount of pollution is the same. When the firm must pay to pollute, it produces Q . When the firm has the unfettered right to pollute, it produces Q . In a world where bargaining costs nothing, the assignment of legal liability does not matter. A certain equilibrium level of output and its resulting level of pollution will exist regardless of whether firms or consumers own the air. The insight that the same property rights assignment will emerge regardless of the initial assignment of ownership rights, when the costs of negotiation are nonexistent or trivial, is referred to as the **Coase Theorem**.

Miller v. Schoene

Supreme Court of the United States
276 U.S. 272 (1928)

Mr. Justice STONE delivered the opinion of the Court.

Acting under the Cedar Rust Act of Virginia, Acts Va. 1914, c. 36, as amended by Acts Va. 1920, c. 260, defendant in error, the state entomologist, ordered the plaintiffs in error to cut down a large number of ornamental red cedar trees growing on their property, as a means of preventing the communication of a rust or plant disease with which they were infected to the apple orchards in the vicinity. The plaintiffs in error appealed from the order to the circuit court of Shenandoah county which, after a hearing and a consideration of evidence, affirmed the order and allowed to plaintiffs in error \$100 to cover the expense of removal of the cedars. Neither the judgment of the court nor the statute as interpreted allows compensation for the value of the standing cedars or the decrease in the market value of the realty caused by their destruction whether considered as ornamental trees or otherwise. But they save to plaintiffs in error the privilege of using the trees when felled.

* * *

As shown by the evidence and as recognized in other cases involving the validity of this statute, cedar rust is an infectious plant disease in the form of a fungoid organism which is destructive of the fruit and foliage of the apple, but without effect on the value of the cedar. Its life cycle has two phases which are passed alternately as a growth on red cedar and on apple trees. It is communicated by spores from one to the other over a radius of at least two miles. It appears not to be communicable between trees of the same species, but only from one species to the other, and other plants seem not to be appreciably affected by it. The only practicable method of controlling the disease and protecting apple trees from its ravages is the destruction of all red cedar trees, subject to the infection, located within two miles of apple orchards.

The red cedar, aside from its ornamental use, has occasional use and value as lumber. It is indigenous to Virginia, is not cultivated or dealt in commercially on any substantial scale, and its value throughout the state is shown to be small as compared with that of the apple orchards of the state. Apple growing is one of the principal agricultural pursuits in Virginia. The apple is used there and exported in large quantities. Many millions of dollars are invested in the orchards, which furnish employment for a large portion of the population, and have induced the development of attendant railroad and cold storage facilities.

On the evidence we may accept the conclusion of the Supreme Court of Appeals that the state was under the necessity of making a choice between the preservation of one class of property and that of the other wherever both existed in dangerous proximity. It would have been none the less a choice if, instead of enacting the present statute, the state, by doing nothing, had permitted serious injury to the apple orchards within its borders to go on unchecked. When forced to such a choice the state does not exceed its constitutional powers by deciding upon the destruction of one class of property in order to save another which, in the judgment of the legislature, is of greater value to the public. It will not do to say that the case is merely one of a conflict of two private interests and that the misfortune of apple growers may not be shifted to cedar owners by ordering the destruction of their property; for it is obvious that there may be, and that here there is, a preponderant public concern in the preservation of the one interest over the other.

* * *

Fontainebleau Hotel Corp. v. Forty-Five Twenty-Five, Inc.District Court of Appeal of Florida
114 So. 2d 357 (1959)

PER CURIAM.

This is an interlocutory appeal from an order temporarily enjoining the appellants from continuing with the construction of a fourteen-story addition to the Fontainebleau Hotel, owned and operated by the appellants. Appellee, plaintiff below, owns the Eden Roc Hotel, which was constructed in 1955, about a year after the Fontainebleau, and adjoins the Fontainebleau on the north. Both are luxury hotels, facing the Atlantic Ocean. The proposed addition to the Fontainebleau is being constructed twenty feet from its north property line, 130 feet from the mean high water mark of the Atlantic Ocean, and 76 feet 8 inches from the ocean bulkhead line. The 14-story tower will extend 160 feet above grade in height and is 416 feet long from east to west. During the winter months, from around two o'clock in the afternoon for the remainder of the day, the shadow of the addition will extend over the cabana, swimming pool, and sunbathing areas of the Eden Roc, which are located in the southern portion of its property.

In this action, plaintiff-appellee sought to enjoin the defendants-appellants from proceeding with the construction of the addition to the Fontainebleau (it appears to have been roughly eight stories high at the time suit was filed), alleging that the construction would interfere with the light and air on the beach in front of the Eden Roc and cast a shadow of such size as to render the beach wholly unfitted for the use and enjoyment of its guests, to the irreparable injury of the plaintiff. . . . It was also alleged that the construction would interfere with the easements of light and air enjoyed by plaintiff and its predecessors in title for more than twenty years. . . .

The chancellor heard considerable testimony on the issues made by the complaint and the answer and, as noted, entered a temporary injunction restraining the defendants from continuing with the construction of the addition. His reason for so doing was stated by him, in a memorandum opinion, as follows:

“In granting the temporary injunction in this case the Court wishes to make several things very clear. The ruling is not based on any alleged presumptive title nor prescriptive right of the plaintiff to light and air nor is it based on any deed restrictions nor recorded plats in the title of the plaintiff nor of the defendant nor of any plat of record. It is not based on any zoning ordinance nor on any provision of the building code of the City of Miami Beach nor on the decision of any court, nisi prius or appellate. It is based solely on the proposition that no one has a right to use his property to the injury of another. In this case it is clear from the evidence that the proposed use by the Fontainebleau will materially damage the Eden Roc. . . .”

This is indeed a novel application of the maxim *sic utere tuo ut alienum non laedas*. This maxim does not mean that one must never use his own property in such a way as to do any injury to his neighbor. It means only that one must use his property so as not to injure the lawful *rights* of another. [U]nder this maxim, . . .”it is well settled that a property owner may put his own property to any reasonable and lawful use, so long as he does not thereby deprive the adjoining landowner of any right of enjoyment of his property which is recognized and protected by law, and so long as his use is not such a one as the law will pronounce a nuisance.”

No American decision has been cited, and independent research has revealed none, in which it has been held that—in the absence of some contractual or statutory obligation—a landowner has a legal right to the free flow of light and air across the adjoining land of his neighbor. Even at common law, the landowner had no legal right, in the absence of an easement or uninterrupted use and enjoyment for a period of 20 years, to unobstructed light and air from the adjoining land...

There being, then, no legal right to the free flow of light and air from the adjoining land, it is universally held that where a structure serves a useful and beneficial purpose, it does not give rise to a cause of action, either for damages or for an injunction under the maxim *sic utere tuo ut alienum non laedas*, even though it causes injury to another by cutting off the light and air and interfering with the view that would otherwise be available over adjoining land in its natural state, regardless of the fact that the structure may have been erected partly for spite...

We see no reason for departing from this universal rule. If, as contended on behalf of plaintiff, public policy demands that a landowner in the Miami Beach area refrain from constructing buildings on his premises that will cast a shadow on the adjoining premises, an amendment of its comprehensive planning and zoning ordinance, applicable to the public as a whole, is the means by which such purpose should be achieved. (No opinion is expressed here as to the validity of such an ordinance, if one should be enacted pursuant to the requirements of law. Cf. *City of Miami Beach v. State ex rel. Fontainebleau Hotel Corp.*, Fla.App.1959, 108 So.2d 614, 619; certiorari denied, Fla.1959, 111 So.2d 437.) But to change the universal rule—and the custom followed in this state since its inception—that adjoining landowners have an equal right under the law to build to the line of their respective tracts and to such a height as is desired by them (in absence, of course, of building restrictions or regulations) amounts, in our opinion, to judicial legislation...

The record affirmatively shows that no statutory basis for the right sought to be enforced by plaintiff exists. The so-called Shadow Ordinance enacted by the City of Miami Beach at plaintiff's behest was held invalid in *City of Miami Beach v. State ex rel. Fontainebleau Hotel Corp.*, supra. It also affirmatively appears that there is no possible basis for holding that plaintiff has an easement for light and air, either express or implied, across defendants' property, nor any prescriptive right thereto...

* * *

Since it affirmatively appears that the plaintiff has not established a cause of action against the defendants by reason of the structure here in question, the order granting a temporary injunction should be and it is hereby reversed with directions to dismiss the complaint.

Reversed with directions.

Notes and Questions

1. The Coase Theorem: Coase's analysis suggests that free-market economies will tend to produce an efficient resource allocation whenever property rights are clearly assigned and the transaction costs of exchanging them are sufficiently low. When these conditions are met, efficiency will occur regardless of the initial distribution of property rights.

For example, in *Miller v. Schoene*, the apple grower would assess the probable damage to his crop and be willing to pay up to that amount to eliminate the damage. Similarly, the cedar grower would assess the additional value of his standing trees over their cut

value, and be willing to accept any greater amount to cut them down. Thus, regardless of the initial distribution of property rights, if the apple growers' damage was greater than the cedar growers' additional value of standing trees, and, again, assuming costless transactions, the apple grower would compensate the cedar grower to cut down his trees. For additional discussion of *Miller v. Schoene*, see James M. Buchanan, *Politics, Property, and the Law: An Alternative Interpretation of Miller et al. v. Schoene*, 15 *Journal of Law & Economics* 439, 443 (1972).

Moreover, according to the Coase Theorem, government intervention in the form of pollution guidelines, tax penalties, and the like cannot improve upon a settlement negotiated by those parties who are directly involved in the externality problem. The Coase Theorem, which is discussed in more detail in Chapter IV on Externalities, was first published in 1960. Ronald H. Coase, *The Problem of Social Cost*, 3 *Journal of Law & Economics* 1–44 (1960), is the most cited economics article for the period since its publication. Other economists, not Coase himself, named his insight The Coase Theorem.

2. Let the Bargaining Begin: In order for the Coasian bargaining to begin, property rights must be clearly assigned and alienable. Suppose that there was no legal system to enforce property rights and contracts dealing with property rights. Neighbors would be reluctant to pay a firm not to pollute because, after accepting the payment, the firm could renege on its promise to reduce pollution and the neighbors would have no legal recourse. Obviously, one would be surprised to see market solutions to externality problems under such conditions. In one sense, the *Fontainebleau* case is merely about clarifying the initial assignment of rights. Once it is clear that the Fontainebleau has the right to build, there is opportunity for the Eden Roc to purchase that right from it. On the other hand, suppose the plaintiff had won the lawsuit and the court issued a permanent injunction against building the addition. Does the initial assignment of property rights affect the ultimate allocation?

3. Caveat: Transaction Costs: Coase recognized that, in order for the free market to solve the problem of externalities, transaction costs—which include search and information costs, bargaining and decision costs, and policing and enforcement costs—must be low. High transaction costs can prevent a preferred, wealth enhancing exchange from occurring. In our pollution example, the firm might be willing to limit its pollution for a payment that is far less than the collective damage imposed on the neighbors, but the costs of bargaining with the firm combined with the costs of reaching agreement on how the neighbors split the payment can prevent the mutually beneficial agreement from being reached. Generally, the costs of reaching an agreement increase with the number of bargainers. In our example, the likelihood of reaching an efficient agreement is highest if the firm only has to bargain with one neighbor who owns all the surrounding property. One exception, however, is when two parties are locked into dealing with each other, rather than being able to seek out another party with whom to deal (the problem of “bilateral monopoly”). Were the transaction costs low in *Fontainebleau*?

4. Caveat: Wealth Effects: The Coase Theorem concerns the allocation of resources; it also has important implications for the distribution of resources (wealth). For example, the initial allocation of legal rights means that the initial holder of the rights will be able to continue a given activity without having to pay or will have to be paid to stop engaging in the activity, instead of vice versa. The opportunity cost of refusing to sell one's initial allocation of property rights is determined by how much others are willing to pay. If the others do not have the wealth to purchase the rights, then transactions will not occur. Moreover, some parties might find it easier to refuse to accept offers to buy their rights than to garner the resources to buy the rights if they are initially allocated to the other party.

5. *Politics and the Assignment of Property Rights:* The Coase Theorem demonstrates how voluntary exchange can solve conflicts over the use of property. The plaintiff in *Fontainebleau* attempted to avoid the bargaining process by using the political process to engineer the passage of the Shadow Ordinance. Evidently, the plaintiff believed that it was cheaper to use the power of the state to coerce the defendant into not building the addition than to pay for the right. The plaintiff then attempted a novel legal theory to avoid having to pay the Fontainebleau not to expand.

C. Legal Analysis and the Art of Economics

An important distinction between traditional legal analysis of cases and the economic analysis of law is found in the overall perspectives of legal versus economic analysis. Legal analysis tends to adopt an *ex post* perspective while economic analysis adopts an *ex ante* perspective. An *ex post* perspective means that one makes a decision today on the basis of yesterday's activity. By the time a case reaches a courtroom, the events that have precipitated the litigation have occurred. In other words, the court is faced with apportioning gains (or losses) among the parties to the suit, with the total gain (or loss) having been fixed by the prior events. Traditional legal analysis tends to focus on the distribution of wealth in a static setting. Yet, any decision by the court that modifies or creates a legal rule will affect the decisions of future parties. In contrast, an *ex ante* perspective means that one considers the consequences of today's decisions on tomorrow's activity. Instead of after-the-fact static analysis of the distributional consequences of a ruling, the *ex ante* perspective considers the dynamic consequences of today's decision on future economic actors who are not parties to the present dispute.

The *ex ante* perspective is merely a reflection of economic principles:

The art of economics consists in looking not merely at the immediate but also at the longer effects of any act or policy; it consists in tracing the consequences of that policy not merely for one group but for all groups.⁴

Economics is forward looking. For example, the concept of opportunity cost tells us that the cost of engaging in any activity is the value of the next best alternative activity that could have been undertaken. That is, opportunity cost is determined by making the decision to do one activity in the future at the expense of some alternative future activity. Also, economics says that incentives matter—alternative legal rules will have an impact on future behavior.

Eldred v. Ashcroft

Supreme Court of the United States
537 U.S. 186 (2003)

JUSTICE GINSBURG delivered the opinion of the Court.

This case concerns the authority the Constitution assigns to Congress to prescribe the duration of copyrights. The Copyright and Patent Clause of the Constitution, Art. I, §8, cl. 8, provides as to copyrights: “Congress shall have Power . . . to promote the Progress of Science . . . by securing [to Authors] for limited Times . . . the exclusive Right to their . . .

4. Henry Hazlitt, *Economics in One Lesson* 5 (1947).

Writings.” In 1998, in the measure here under inspection, Congress enlarged the duration of copyrights by 20 years. Copyright Term Extension Act (CTEA), Pub. L. 105-298, § 102(b) and (d). As in the case of prior extensions, principally in 1831, 1909, and 1976, Congress provided for application of the enlarged terms to existing and future copyrights alike.

Petitioners are individuals and businesses whose products or services build on copyrighted works that have gone into the public domain. They seek a determination that the CTEA fails constitutional review under ... the Copyright Clause’s “limited Times” prescription.... Under the 1976 Copyright Act, copyright protection generally lasted from the work’s creation until 50 years after the author’s death. Under the CTEA, most copyrights now run from creation until 70 years after the author’s death. Petitioners do not challenge the “life-plus-70-years” time span itself.... Congress went awry, petitioners maintain, not with respect to newly created works, but in enlarging the term for published works with existing copyrights....

In accord with the District Court and the Court of Appeals, we reject petitioners’ challenges to the CTEA. In that 1998 legislation, as in all previous copyright term extensions, Congress placed existing and future copyrights in parity. In prescribing that alignment, we hold, Congress acted within its authority and did not transgress constitutional limitations.

* * *

We address first the determination of the courts below that Congress has authority under the Copyright Clause to extend the terms of existing copyrights. Text, history, and precedent, we conclude, confirm that the Copyright Clause empowers Congress to prescribe “limited Times” for copyright protection and to secure the same level and duration of protection for all copyright holders, present and future.

* * *

Congress’ consistent historical practice of applying newly enacted copyright terms to future and existing copyrights reflects a judgment stated concisely by Representative Huntington at the time of the 1831 Act: “Justice, policy, and equity alike forbid” that an “author who had sold his [work] a week ago, be placed in a worse situation than the author who should sell his work the day after the passing of [the] act.” The CTEA follows this historical practice by keeping the duration provisions of the 1976 Act largely in place and simply adding 20 years to each of them. Guided by text, history, and precedent, we cannot agree with petitioners’ submission that extending the duration of existing copyrights is categorically beyond Congress’ authority under the Copyright Clause.

Satisfied that the CTEA complies with the “limited Times” prescription, we turn now to whether it is a rational exercise of the legislative authority conferred by the Copyright Clause. On that point, we defer substantially to Congress.

The CTEA reflects judgments of a kind Congress typically makes, judgments we cannot dismiss as outside the Legislature’s domain. As respondent describes, a key factor in the CTEA’s passage was a 1993 European Union (EU) directive instructing EU members to establish a copyright term of life plus 70 years. Consistent with the Berne Convention, the EU directed its members to deny this longer term to the works of any non-EU country whose laws did not secure the same extended term. By extending the baseline United States copyright term to life plus 70 years, Congress sought to ensure that American authors would receive the same copyright protection in Europe as their European counterparts. The CTEA may also provide greater incentive for American and other authors to create and disseminate their work in the United States.

In addition to international concerns, Congress passed the CTEA in light of demographic, economic, and technological changes,⁵ and rationally credited projections that longer terms would encourage copyright holders to invest in the restoration and public distribution of their works.⁶

* * *

As we read the Framers' instruction, the Copyright Clause empowers Congress to determine the intellectual property regimes that, overall, in that body's judgment, will serve the ends of the Clause. Beneath the facade of their inventive constitutional interpretation, petitioners forcefully urge that Congress pursued very bad policy in prescribing the CTEA's long terms. The wisdom of Congress' action, however, is not within our province to second guess. Satisfied that the legislation before us remains inside the domain the Constitution assigns to the First Branch, we affirm the judgment of the Court of Appeals.

It is so ordered.

JUSTICE STEVENS, dissenting

* * *

... [R]espondent relies on concerns of equity to justify the retroactive extension. If Congress concludes that a longer period of exclusivity is necessary in order to provide an adequate incentive to authors to produce new works, respondent seems to believe that simple fairness requires that the same lengthened period be provided to authors whose works have already been completed and copyrighted. This is a classic non sequitur. The reason for increasing the inducement to create something new simply does not apply to an already-created work. To the contrary, the equity argument actually provides strong support for petitioners. Members of the public were entitled to rely on a promised access to copyrighted or patented works at the expiration of the terms specified when the exclusive privileges were granted. On the other hand, authors will receive the full benefit of the exclusive terms that were promised as an inducement to their creativity, and have no equitable claim to increased compensation for doing nothing more.

5. Members of Congress expressed the view that, as a result of increases in human longevity and in parents' average age when their children are born, the pre-CTEA term did not adequately secure "the right to profit from licensing one's work during one's lifetime and to take pride and comfort in knowing that one's children—and perhaps their children—might also benefit from one's posthumous popularity." Also cited was "the failure of the U.S. copyright term to keep pace with the substantially increased commercial life of copyrighted works resulting from the rapid growth in communications media."

6. JUSTICE BREYER urges that the economic incentives accompanying copyright term extension are too insignificant to "move" any author with a "rational economic perspective." Calibrating rational economic incentives, however, like "fashioning ... new rules [in light of] new technology," is a task primarily for Congress, not the courts. Congress heard testimony from a number of prominent artists; each expressed the belief that the copyright system's assurance of fair compensation for themselves and their heirs was an incentive to create. We would not take Congress to task for crediting this evidence which, as JUSTICE BREYER acknowledges, reflects general "propositions about the value of incentives" that are "undeniably true."

Congress also heard testimony from Register of Copyrights Marybeth Peters and others regarding the economic incentives created by the CTEA. According to the Register, extending the copyright for existing works "could ... provide additional income that would finance the production and distribution of new works." "Authors would not be able to continue to create," the Register explained, "unless they earned income on their finished works. The public benefits not only from an author's original work but also from his or her further creations. Although this truism may be illustrated in many ways, one of the best examples is Noah Webster[,] who supported his entire family from the earnings on his speller and grammar during the twenty years he took to complete his dictionary."

* * *

JUSTICE BREYER, dissenting.

* * *

This statute, like virtually every copyright statute, imposes upon the public certain expression-related costs in the form of (1) royalties that may be higher than necessary to evoke creation of the relevant work, and (2) a requirement that one seeking to reproduce a copyrighted work must obtain the copyright holder's permission. The first of these costs translates into higher prices that will potentially restrict a work's dissemination. The second means search costs that themselves may prevent reproduction even where the author has no objection....

* * *

What copyright-related benefits might justify the statute's extension of copyright protection? First, no one could reasonably conclude that copyright's traditional economic rationale applies here. The extension will not act as an economic spur encouraging authors to create new works. No potential author can reasonably believe that he has more than a tiny chance of writing a classic that will survive commercially long enough for the copyright extension to matter. After all, if, after 55 to 75 years, only 2% of all copyrights retain commercial value, the percentage surviving after 75 years or more (a typical pre-extension copyright term)—must be far smaller. And any remaining monetary incentive is diminished dramatically by the fact that the relevant royalties will not arrive until 75 years or more into the future, when, not the author, but distant heirs, or shareholders in a successor corporation, will receive them. Using assumptions about the time value of money provided us by a group of economists (including five Nobel prize winners), Brief for George A. Akerlof et al. as *Amici Curiae* 5–7, it seems fair to say that, for example, a 1% likelihood of earning \$100 annually for 20 years, starting 75 years into the future, is worth less than seven cents today.

What potential Shakespeare, Wharton, or Hemingway would be moved by such a sum? What monetarily motivated Melville would not realize that he could do better for his grandchildren by putting a few dollars into an interest-bearing bank account? The Court itself finds no evidence to the contrary. It refers to testimony before Congress (1) that the copyright system's incentives encourage creation, and (2) (referring to Noah Webster) that income earned from one work can help support an artist who "continues to create." But the first of these amounts to no more than a set of undeniably true propositions about the value of incentives *in general*. And the applicability of the second to *this* Act is mysterious. How will extension help today's Noah Webster create new works 50 years after his death? Or is that hypothetical Webster supposed to support himself with the extension's present discounted value, *i.e.*, a few pennies? Or (to change the metaphor) is the argument that Dumas *filis* would have written more books had Dumas *pere's* *Three Musketeers* earned more royalties?

Regardless, even if this cited testimony were meant more specifically to tell Congress that somehow, somewhere, some potential author might be moved by the thought of great-grandchildren receiving copyright royalties a century hence, so might some potential author also be moved by the thought of royalties being paid for two centuries, five centuries, 1,000 years, "til the End of Time." And from a rational economic perspective the time difference among these periods *makes no real difference*. The present extension will produce a copyright period of protection that, even under conservative assumptions, is worth more than 99.8% of protection *in perpetuity* (more than 99.99% for a songwriter like Irving Berlin and a song like Alexander's Ragtime Band). The lack of a practically meaningful

distinction from an author's *ex ante* perspective between (a) the statute's extended terms and (b) an infinite term makes this latest extension difficult to square with the Constitution's insistence on "limited Times."

* * *

In any event, the incentive-related numbers are far too small for Congress to have concluded rationally, even with respect to new works, that the extension's economic-incentive effect could justify the serious expression-related harms earlier described. And, of course, in respect to works already created—the source of many of the harms previously described—the *statute creates no economic incentive at all*.

Second, the Court relies heavily for justification upon international uniformity of terms. Although it can be helpful to look to international norms and legal experience in understanding American law, in this case the justification based upon foreign rules is surprisingly weak.

* * *

Finally, the Court mentions as possible justifications "demographic, economic, and technological changes"—by which the Court apparently means the facts that today people communicate with the help of modern technology, live longer, and have children at a later age. The first fact seems to argue not for, but instead against, extension. The second fact seems already corrected for by the 1976 Act's life-plus-50 term, which automatically grows with lifespans. And the third fact—that adults are having children later in life—is a makeweight at best, providing no explanation of why the 1976 Act's term of 50 years after an author's death—a longer term than was available to authors themselves for most of our Nation's history—is an insufficient potential bequest. The weakness of these final rationales simply underscores the conclusion that emerges from consideration of earlier attempts at justification: There is no legitimate, serious copyright-related justification for this statute.

* * *

This analysis leads inexorably to the conclusion that the statute cannot be understood rationally to advance a constitutionally legitimate interest. The statute falls outside the scope of legislative power that the Copyright Clause, read in light of the First Amendment, grants to Congress. I would hold the statute unconstitutional. I respectfully dissent.

Notes and Questions

1. *Ex Post v. Ex Ante Analysis:* Now-Judge (then-law professor) Frank Easterbrook explains the distinction between *ex post* and *ex ante* analysis from an economic perspective, with specific application to intellectual property cases:

The nature of litigation invites judges to treat the parties' circumstances as fixed and to apportion gains and losses. . . . [For example,] [o]nce a firm possesses a patent and tries to extract royalties, it may seem wise to restrict the devices available to that end; the royalties lead to less use of the invention and consequent social loss, while restricting the collection of royalties has no visible social costs. . . .

When judges take the positions of the parties as given, however, they forfeit any opportunity to create gains through the formulation of the legal rule. The principles laid down today will influence whether similar parties *will be* in similar situations tomorrow. Indeed, judges who look at cases merely as occasions for the fair apportionment of gains and losses almost invariably ensure that there

will be fewer gains and more losses tomorrow. . . . [Thus,] [w]hen a court restricts the patent holder's ability to collect royalties, it reduces the rewards anticipated from patents and thus the incentive for other people to invent.

* * *

. . . Judges who see economic transactions as zero-sum games are likely to favor "fair" divisions of the gains and losses. If the stakes are established in advance and will not be altered by courts, why should judges harshly require one party to bear the whole loss or allow another to take the gain? Yet if legal rules can create larger gains (or larger losses), the claim from fairness becomes weaker. The judge will pay less attention to today's unfortunates and more attention to the affects of rules.

* * *

The first line of inquiry, then is whether the Justices take an *ex ante* or an *ex post* perspective in analyzing issues. Which they take will depend, in part, on the extent to which they appreciate how the economic system creates new gains and losses; those who lack this appreciation will favor "fair" treatment of the parties.

Frank H. Easterbrook, *The Supreme Court, 1983 Term: Foreword: The Court and the Economic System*, 98 *Harvard Law Review* 4, 10–12 (1984). In other words, the perspective the court adopts, either *ex ante* or *ex post* or some combination, will change incentives and behavior at the margin.

2. Why Protect Intellectual Property Rights?: The standard economic case for protecting intellectual property rights, such as the copyright protection given to creative works at issue in *Eldred*, takes very much an *ex ante* perspective: to provide a greater incentive for authors to write, musicians to compose, and artists to paint by restricting the ability of others to copy those works without permission (and possible royalty payment to the creator). Mark Lemley describes this "traditional economic justification for intellectual property" as follows:

Ideas are public goods: they can be copied freely and used by anyone who is aware of them without depriving others of their use. But ideas also take time and money to create. Because ideas are so easy to spread and so hard to control, only with difficulty may creators recoup their investment in creating the idea. As a result, absent intellectual property protection, most would prefer to copy rather than create ideas, and inefficiently few ideas would be created.

Mark A. Lemley, *Ex Ante versus Ex Post Justifications for Intellectual Property*, 71 *University of Chicago Law Review* 129, 129 (2004); see also William M. Landes & Richard A. Posner, *The Economic Structure of Intellectual Property Law* 11–36 (2003) (comparing the economics of property rights generally with the economics of intellectual property rights). Thus, an important justification for the Copyright Term Extension Act (CTEA), which extended the term of copyright protection by twenty years, was that it would "provide greater incentive for American and other authors to create and disseminate their work in the United States." Conversely, an *ex post* perspective on intellectual property rights would, as Judge Easterbrook indicated, focus on the "fairness" of the distribution of royalties, without regard to any incentive effects.

3. How Much Greater of an Incentive?: The majority and dissent disagreed in *Eldred* over how much of an additional incentive (i.e., incentive at the margin) the additional twenty years of protection would provide. Because those additional years are added to

the end of the previous term (the creator's lifetime plus fifty years), we need to adjust the potential value of any additional royalties for how long it will be before the creator receives them. That adjustment is made by calculating the present value of the additional royalties. As we will see throughout these materials, present value is a fundamental concept underlying value. The present value of an asset (or anything) is a single number that captures the future stream of benefits or costs of an activity, adjusted for the fact that a benefit received later is worth less than the same benefit received sooner. This adjustment is calculated by discounting the stream by the appropriate interest rate. The process is explained in more detail in Chapter X, but the economists' brief in *Eldred* does the calculations for us, demonstrating that the marginal benefit today of the future royalties is exceedingly small. As Justice Breyer's dissent states: "for example, a 1% likelihood of earning \$100 annually for 20 years, starting 75 years into the future, is worth less than seven cents today."

4. Ex Post Analysis: Dividing Up the Pie: However, the CTEA extended the copyright term not only for newly created works, but also for existing works. Justice Breyer plainly is correct that the additional royalties cannot increase the incentive for creating existing works because those works already have been created! So what justification is there for extending the copyright term for existing works? Here the government in defending the statute fell back on considerations of fairness, arguing that fairness required existing copyright holders to be treated the same as creators of new works. But what about fairness to those who wanted to use the existing works without having to incur the costs of negotiating permission agreements or paying royalties? In enacting the CTEA, Congress basically redivided the pie between existing copyright holders and potential users of works in the public domain. Indeed, one of the strongest supporters of the CTEA was the Disney Corporation, whose copyright on Mickey Mouse was soon to expire. Hence, the CTEA is sometimes called the "Mickey Mouse Law" (pun intended, no doubt). In Chapter III we will discuss further how interest groups lobby for laws that provide them with special benefits and protections, an activity economists call "rent seeking."

5. Law and Economics and Justice: Sometimes law and economics is criticized for not taking into account the "justice" element of a case or controversy. How does the ex ante perspective help us understand ex post "justice"?

D. Game Theory

Many economic decisions are made in a setting of imperfect information where one decision maker knows that the actions of other decision makers will impact the outcome of his or her decision. This interdependence requires decision makers to develop a strategy for dealing with the imperfect information. Game theory is the area of economics that has developed to deal with mutual interdependence and imperfect information. Recent developments in game theory have provided many insights for the economic analysis of law.

Game theory analyzes the behavior of "players" in conflict situations governed by rules. As one might expect, the expected outcome—or **dominant strategy**—of the games is determined by the stakes under alternative rules. The relevance of this area of economics to law is obvious, as law is often concerned with conflict within a set of rules. Game theory helps predict how the strategies of players change and how the expected outcomes vary as the players are faced with alternative rules.

The most basic model of game theory is the Prisoners' Dilemma. The Prisoners' Dilemma is best introduced through a hypothetical story. Adam and Baker work together in the accounting office of a major New York bank. They are best friends. One day an auditor shows up and, after a thorough audit of the bank's accounts, determines that \$1 million has been embezzled. Upon further investigation, all available circumstantial evidence indicates that only Adam or Baker could have committed the crime. However, there is no evidence—such as conspicuous consumption of automobiles, vacations, and so forth—to indicate which one committed the crime. In fact, the police suspect that they were in it together. Remember, they are (were?) best friends. Both Adam and Baker are charged with embezzlement. The police are confident that they can convict both defendants on the available evidence, but securing a confession of a conspiracy from one of the defendants would save the police a lot of time and effort. Both Adam and Baker claim to be innocent.

Immediately following their arrests, Adam and Baker are held in separate cells in the City Jail. They are totally shut off from one another—communication of any type is impossible. The City Prosecutor, who does not want to go through a long trial, makes the following offer to Adam: (I) If you refuse to testify, and if Baker continues to maintain his silence, you will be convicted of criminally negligent bookkeeping (a new crime created in the wake of the Enron and WorldCom debacles of 2001 and 2002) and sentenced to 3 years in prison; (II) If you agree to testify against Baker, and if Baker continues to maintain his silence, then the charges against you will be dropped; (III) If you refuse to testify, and if Baker testifies against you, then you will go to jail for 15 years; (IV) If both you and Baker testify against each other, then you will both go to jail for 10 years. Finally, the City Prosecutor says that his assistant is simultaneously making the exact same offer to Baker.

The Prisoners' Dilemma is evident when Adam's choices are presented in matrix form. The payoffs to Adam under alternative strategies are represented in Figure I-2 (a). Cells I-IV indicate the rules of the game as set forth by the City Prosecutor. Baker's behavior, which is totally exogenous (beyond Adam's control), is represented by the column on the left side of the matrix. Adam's strategy is represented by the row at the top of the matrix. The four cells represent the four possible outcomes of Adam's dilemma. In the formal language of game theory, the four cells are referred to as the "choice space" or "opportunity set." Consideration of the matrix reveals that the testify strategy **dominates** the silence strategy. No matter what strategy Baker chooses, Adam is better off having chosen to testify. But this is not the end of the story.

Recall that at the same time that the City Prosecutor is making his pitch to Adam, his assistant is making the exact same offer to Baker. Baker's opportunity set is presented in Figure I-2 (b). Clearly, the testify strategy also dominates for Baker—it always results in the lowest jail sentence.

The Prisoners' Dilemma is revealed when the symmetrical payoff functions are combined in a single matrix. In Figure I-2 (c), the payoffs to Adam are indicated by the right-hand numbers in each cell. The payoffs to Baker are indicated by the left-hand numbers. Since the prosecutors' rules make it individually rational for each party to adopt the testify strategy, the **solution** to this game is predicted to be Cell IV. In economic models, such a predictable solution is referred to as an equilibrium. The true nature of the Prisoners' Dilemma is revealed by the observation that Cell IV contains the largest total number of years in prison. Adam and Baker would both be better off if they could make an enforceable contract under which both agree to remain silent. Cell I appears very attractive relative to ending up in Cell IV.

Figure I-2. Prisoner's Dilemma

Figure (a) - Adam's Payoff

		Adam Stays Quiet	Adam Talks	
Baker Stays Quiet	I	-3	0	II
Baker Talks	III	-15	-10	IV

Figure (b) - Baker's Payoff

		Adam Stays Quiet	Adam Talks	
Baker Stays Quiet	I	-3	-15	II
Baker Talks	III	0	-10	IV

Figure (c) - Combined Payoffs (Adam, Baker)

		Adam Stays Quiet	Adam Talks	
Baker Stays Quiet	I	-3	-15	II
Baker Talks	III	0	-10	IV

Ideal Strategy → (points to cell I)
 ← Solution (points to cell IV)

Page v. United States

United States Court of Appeals for the Seventh Circuit
884 F.2d 300 (1989)

Easterbrook, J.

Students of strategy and bargaining cut their teeth on the game of Prisoners' Dilemma. Two prisoners, unable to confer with one another, must decide whether to take the prosecutor's offer: confess, inculcate the other, and serve a year in jail, or keep silent and serve five years. If the prisoners could make a (binding) bargain with each other, they would keep silent and both would go free. But they can't communicate, and each fears that the other will talk. So both confess. Studying Prisoners' Dilemma has led to many insights about strategic interactions. See Thomas C. Schelling, *The Strategy of Conflict* 53-80, 119-61 (1960; 1980 rev.); Robert Axelrod, *The Evolution of Cooperation* (1984). Eldon Page did not have the leisure to study the game before he had to play it.

Page and Maurice Falls were charged with armed bank robbery. On the day set for Page's trial, the prosecutor appeared with Falls in tow. Falls had signed an agreement promising, in exchange for a lower sentence, to plead guilty and testify against Page. After the judge accepted Falls' plea, Page caved in and pleaded guilty too. Back in jail, Falls and Page were able at last to coordinate. Each presently asked leave to withdraw his plea. Too late, the judge said. Both were sentenced and appealed. We affirmed in an unpublished order.

Page tried again, filing a petition under 28 U.S.C. § 2255 and arguing that trial counsel rendered ineffective assistance in letting him plead guilty. This was brought up short by the fact that Page had not argued on his original appeal that trial counsel was constitutionally

inadequate. Because Page had fresh counsel for the appeal, the omission forfeits the point unless Page could establish “cause” for and “prejudice” from the neglect. See *Wainwright v. Sykes*, 433 U.S. 72 (1977). Ineffective assistance of counsel is “cause,” so Page maintains that his appellate counsel was ineffective in failing to challenge the effectiveness of trial counsel. Page also points to other aspects of appellate counsel’s performance that he finds deficient. Fearing infinite regress, the district judge brushed aside all questions concerning appellate counsel and went straight to the foundation of the claim, holding that Page’s trial counsel had supplied effective assistance and denying the petition for relief.

The first question facing us on Page’s appeal is whether ineffective assistance of counsel may be raised at all, and if so in which court. The United States Attorney insists that the attack on appellate counsel comes too late. It, too, was surrendered because not raised on appeal. Such an argument is better suited to the works of Ionesco and Beckett than to the Federal Reporter. How could appellate counsel attack his own competence? Although this is not logically impossible (counsel could say, for example, that although he knew he ought to challenge trial counsel he had not had the time to prepare a brief on the subject), it is so implausible that we cannot demand it of counsel. Few of us have insight into our shortcomings; fewer still have the nerve to flaunt our own failings. Just as trial counsel need not attack his competence during trial, appellate counsel need not protest his inadequacies. That may be left to the next step in the process without fear of forfeiture.

“Where” is slightly more difficult than “whether.” Two courts of appeals have held that the defendant’s exclusive recourse is a motion asking the court of appeals to recall its mandate on the ground of counsel’s inadequacy. *Feldman v. Henman*, 815 F.2d 1318, 1321–22 (9th Cir. 1987); *United States v. Winterhalder*, 724 F.2d 109, 111 (10th Cir. 1983). They reason that because district judges must obey the mandate of the court of appeals, and may not issue orders compelling appellate courts to do anything (such as hear the appeal anew, a common remedy for deficient appellate counsel), the claim must come to the court of appeals in the first instance. Other courts of appeals have allowed defendants to start in the district courts. E.g., *Mack v. Smith*, 659 F.2d 23, 25–26 (5th Cir. 1981); *United States v. DeFalco*, 644 F.2d 132, 137 (3d Cir. 1979). We join this latter group.

Section 2255 authorizes collateral attacks on criminal judgments. It also specifies the forum: “the court which imposed the [contested] sentence.” That statutory designation prevails even though relief may call for revision of a judgment that has been affirmed by the court of appeals. Review of existing judgments simply defines a “collateral” attack. If the court of appeals has actually considered and rejected a claim of ineffective assistance of counsel on appeal, that decision binds the district court unless there has been an intervening change of law. But if the issue has never been presented on appeal, it is open in the district court as any other question would be under §2255.

Relief does not require the district court to issue orders to the court of appeals. District courts may grant relief. Ineffective assistance may justify vacating and reentering the judgment of conviction, allowing a fresh appeal. It may also justify a new trial on occasion. Counsel is ineffective only if performance below the norms of the profession causes prejudice. *Strickland v. Washington*, 466 U.S. 668, 687 (1984). Prejudice means a “reasonable probability that, but for counsel’s unprofessional errors, the result of the [appeal] would have been different,” *id.* at 694. Showing a “reasonable probability” but not certainty supports a new judgment and a new appeal (so that we may decide whether the outcome *actually* would have been different). If the showing goes further and establishes to the district court’s satisfaction that reversal would have been a sure thing, this must mean that the district judge has become convinced that there was a fatal error in the trial. *That* error—which may be reached once the ineffective assistance clears away the bar of

Wainwright v. Sykes—requires a new trial or other remedy adequate to rectify the wrong. So whether the remedy turns out to be a new appeal or a new trial, the district judge need not issue an order binding on this court. No rule of law forbids district courts to entertain proceedings that call into question the adequacy of counsel’s performance on appeal. Because district courts are the best forums to conduct any inquiries into counsel’s strategic decisions that may prove necessary, we conclude that Page properly filed this petition in the district court rather than our court.

Having got this far, however, Page is stymied. For appellate counsel need not raise all possible claims of error. One of the principal functions of appellate counsel is winnowing the potential claims so that the court may focus on those with the best prospects. Defendants need dedicated, skillful appellate counsel, not routineers who present every non-frivolous claim. (Recall the saw: “He needed a lawyer, and all he had was a member of the bar.”) Page has not argued that his appellate counsel failed to advocate his cause skillfully on the initial appeal. He has argued, instead, that counsel left out an issue he deems meritorious. The district court responded by deciding that trial counsel had furnished effective assistance, as if the claim of ineffective appellate counsel were equivalent to proof.

The threshold question is not whether trial counsel was inadequate but whether trial counsel was so *obviously* inadequate that appellate counsel had to present that question to render adequate assistance. Counsel could be constitutionally deficient in omitting a dead-bang winner even while zealously pressing other strong (but unsuccessful) claims. Page falls well short of making such a showing, however. Counsel advised Page to get the best deal he could after Falls turned against him. Page is not the first and will not be the last to feel the sting of Prisoners’ Dilemma, and the Constitution does not demand that counsel escape a predicament that game theorists consider inescapable in one-shot performances. The district judge found that Page’s lawyer prepared conscientiously for trial, made appropriate motions, and would have gone forward had Page stood on his former plea of innocence. Page insists that trial counsel lied when informing him that Falls would testify against him; as the district court observed, this is what Falls had promised to do in the written plea agreement. We need not agree with the district court’s conclusion that trial counsel was adequate to see that appellate counsel could have made a reasoned decision to pursue other arguments instead. Page’s remaining claims—that appellate counsel did not consult “meaningfully” with him in preparing the appeal, that counsel’s briefs were vague, that counsel did not file a petition for rehearing after losing—are insufficient to call into question the adequacy of the representation.

AFFIRMED.

Notes and Questions

1. Rational Self-Interest: Given the rules of the Prisoners’ Dilemma game, neither party would make a different choice even if they could talk before they made their plea. In their meeting, they could say that they would cooperate with each other and not confess, however, a rational self-interested person would nonetheless confess. Also, even if each person *knew* what the other would do, they would still choose to confess on each other. Many students find it difficult to understand why individuals like Adam and Baker are *always* better off by confessing. The most common mistake is inadvertently to change the rules of the game. For instance, many people use sanctions (like the Mafia) to change outcomes or they use personal feelings to change the game. Many people say that they would rather cooperate and feel “good” about themselves. However, subject to the caveat in the next note, it is always better to confess against the other person than spend a few extra years in prison.

2. Solving the Prisoners' Dilemma: It has been suggested that one of the reasons the Mafia—or organized crime, in general—has been successful is that the threat of sanctions (that is, execution) for testifying against another member has enabled them to avoid Cell IV. What happens in this scenario is that the Mafia changes the payoffs of the game. A few more years in prison is preferable to a lesser sentence where you are killed. The federal witness protection program is intended to counteract the threat of revenge.

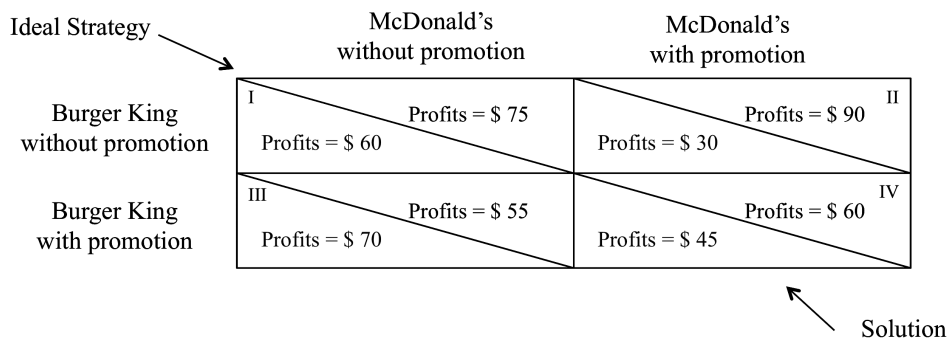
3. The Prosecutor's Incentives: The rules of the game determine the outcome, and the prosecutor makes the rules. A final point about the nature of game theory is revealed by a consideration of the prosecutor's strategy in the earlier story. Suppose the prosecutor is paid based on how many years of prison sentences he produces annually. Alternatively, suppose the prosecutor is paid based on the number of years times the number of individuals convicted. What is the prosecutor's optimal strategy under either set of rules?

4. Game Theory and the Law: Game theory has many applications to the economic analysis of law. As suggested by the basic Prisoners' Dilemma model, it raises questions about the procedural rules that apply to codefendants being represented by the same lawyer. Other applicable areas include cartel theory and antitrust law, bankruptcy and voidable preferential transfers, bank runs and deposit insurance, constitutional economics and social choice theory, apparently coercive contract terms, and the regulation of two-tier tender offers.

5. Advertising Wars: The Prisoners' Dilemma model helps explain behavior observed in the business world. Promotions by large fast-food chains are a prime example. McDonalds and Burger King participate in these promotions which raise production costs (prizes, promotional fees, etc.) to try and steal away the competitor's customers. As shown by Figure I-3, McDonalds would be better off to have the promotion, because no matter what Burger King does, McDonalds realizes more profits (and Burger King has less profits). Of course, Burger King applies the same logic and both franchises offer promotional contests. The dilemma for Burger King and McDonalds is that their joint profits could be maximized if they could coordinate and stay in Cell I. Unfortunately for the firms, they are not allowed to communicate about these contests because it would probably be a violation of the antitrust laws. The best action for each firm acting alone is Cell IV.

6. Game Theory in Law School: Many law school exams are graded on a curve and the professor is required to give grades so that a specific average, such as a B+, is attained.

Figure I-3. McDonald's & Burger King Prisoner's Dilemma



How does the Prisoners' Dilemma model explain the amount of effort law students devote toward studying for such an exam?

7. One-Shot versus Multiple Series Games: One of the major arguments against the Prisoners' Dilemma game is that it is only played one time. That is, if the actors could play multiple times they would realize the dilemma of the game and move from Cell IV to Cell I. These tacit collusive solutions—outcomes without specific, formal agreement—exist where, over an indefinite period of time, firms recognize their own interests will be served when they cooperate and maximize both firms' profits. However, in a multiple series game, where there is a definite ending point, there is a major incentive to cheat on the last round. That is, each firm cooperates until the last round, then they cheat. However, since each firm knows the other will cheat in the last round they cheat in the round before, and this logic works itself backward until the first round of the game. This is known as backward induction.

E. Positive versus Normative Economic Analysis

Economists have traditionally distinguished between positive and normative analysis. **Positive economic analysis** seeks to describe the world as it is, not as one thinks it should be, and thus is (theoretically) “value free.” It seeks to explore the “natural” economic forces that constrain economic behavior. For example, positive economics look to the consequences of a change in a legal rule. Thus, positive economic analysis looks to the future in an effort to compare the consequences of alternative incentive structures. In some instances, the positive economist will identify one arrangement as more **efficient** (within the context of the model) than another, but the positive economist will not say that efficiency is necessarily the best outcome.

Normative analysis, in contrast, makes value judgments when it describes the world as it “ought to be.” There is nothing inherently wrong with making normative statements about alternative economic arrangements; much of our Western philosophical tradition from Plato and Aristotle to Pope John Paul II (see, e.g., *Centesimus Annus*) is concerned with such issues. However, according to the dominant epistemology, there is no scientific way to show whether so-called normative statements are correct. Normative statements cannot be empirically tested. They cannot be falsified.

1. Positive Economic Analysis and Scientific Methodology

Positive economic analysis employs the scientific method—it uses logic to develop **hypotheses**, and tests these hypotheses against empirical evidence. The major advantage of engaging in positive analysis is that you will be able, at least theoretically, to identify the testable implications—in terms of benefits and costs—of implementing alternative institutional arrangements. That is, positive economic analysis provides a method to identify the trade-offs inherent in many policy decisions. As a result, positive economics helps inform the normative decision-making process.

However, as discussed by Nobel Laureate Milton Friedman, the conclusions of positive economics are rarely dispositive on policy issues: “Laymen and experts alike are inevitably tempted to shape positive conclusions to fit strongly held normative preconceptions and to reject positive conclusions if their normative implications – or what are said to be their normative implications – are unpalatable.” Milton Friedman, *Essays in Positive Economics*

2 (1953). Moreover, even agreement about the conclusions of positive economics does not necessarily yield agreement about policy decisions: “Two individuals may agree on the consequences of a particular piece of legislation. One may regard them as desirable on balance and so favor the legislation; the other, as undesirable and so oppose the legislation.” *Id.*

Because of the complexity of markets, economists use numerous abstract models, such as supply and demand (the subject of Chapter II), to develop social science theories about real world behavior. Theory may help us to **understand** and to explain **why**; it helps to develop a broad framework that can be applied to a large number of phenomena. A theory cannot be merely descriptive and dependent upon personalities, like history, but must develop a framework that survives over time. In the jargon of logic, theory deals in **universals**.

Additionally, a theory does not have to be realistic in order to be useful. Obviously, in order to have broad applicability, a theory must simplify and abstract from reality. In one important sense, a theory can be viewed as an instrument, whose value is not how well it conforms with complex reality, but rather in how well it predicts the results of certain events. The supply and demand model, for example, has proven to be very useful in predicting the price and quantity consequences of various stocks on almost every conceivable type of market, even when the market does not exhibit all the characteristics (assumptions) of the model. Thus, it is clear that in one important sense—**prediction**—a theory does not have to be realistic in order to be useful.

Economists employ a rigorous **scientific methodology** in investigating economic phenomena. Standard data collection and testing procedures must be followed in order for conclusions to be accepted as valid. Economists are often called upon to testify in lawsuits. In order for an economist’s testimony to be admitted as evidence, the economist must adhere to scientific standards. As illustrated by the following case, the question of appropriate scientific methodology has taken on added significance in recent years.

In Re Aluminum Phosphide Antitrust Litigation

United States District Court for the District of Kansas

893 F. Supp. 1497 (1995)

Kathryn H. Vratil, United States District Judge

This price-fixing case comes before the Court on *Defendants’ Joint Motion in Limine to Exclude Dr. Richard C. Hoyt’s Testimony and Expert Report From this Case*, filed May 5, 1995. Class action plaintiffs claim that defendants engaged in an illegal price-fixing conspiracy under the Sherman Act, 15 U.S.C. § 1, and—more specifically—that defendants conspired to fix the case price of aluminum phosphide pellets and tablets in the United States from January 1, 1988, through December 31, 1992. Plaintiffs seek damages on behalf of all entities (except those owned by defendants) which purchased such products during that period. Movants seek to preclude certain portions of the testimony and report of plaintiffs’ economic expert, Dr. Richard C. Hoyt, under Federal Rules of Evidence 104(a), 403, 702, and 703.

On May 16, 1995, the Court held an evidentiary hearing on defendants’ motion and heard the testimony of both Dr. Hoyt and defendants’ economic expert, Dr. John J. Siegfried. Having considered the evidence adduced at that hearing, along with the expert reports of both Dr. Hoyt and Dr. Siegfried, the Court finds that defendants’ motion should be and hereby is sustained in the respects and for the reasons set forth below.

A. Factual Background

Aluminum phosphide is a fumigant used to control insects in the storage of raw agricultural commodities and other food and non-food products. Aluminum phosphide reacts with moisture in the air and releases phosphine gas, which is toxic to insects. In the United States, aluminum phosphide is primarily sold in pellets and tablets. . . .

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In the late summer and early fall of 1991, the United States Department of Justice issued subpoenas with respect to an ongoing investigation of criminal price-fixing in the aluminum phosphide industry. On November 1, 1993, that investigation resulted in criminal indictments against [a number of companies in the industry. Defendants here are companies that pleaded guilty or *nolo contendere* to criminal price fixing charges.]

B. Findings of Fact

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Once causation of damages has been established, the amount of damages may be determined by a just and reasonable estimate, as long as the jury verdict is not the product of speculation or guesswork.

Plaintiffs propose to supply this evidence through the expert testimony of Richard C. Hoyt, Ph.D., president of Analytics, Inc., an economics and statistical consulting firm in Excelsior, Minnesota. Dr. Hoyt has a doctorate in Agriculture and Applied Economics. He held teaching positions at the William Mitchell College of Law in St. Paul, Minnesota from 1977 to 1978, and the College of St. Thomas in St. Paul, Minnesota from 1978 to 1979. Since that time, Dr. Hoyt has devoted his full-time attention to forensic ends: a “partial list” of his experience as an expert witness includes 121 cases (42 antitrust cases, 15 contract cases, 21 discrimination cases, 29 injury/death cases, two patent cases, 10 stockholder suits, and two toxic waste cases). . . . Dr. Hoyt is an expert for hire.

Before and After Model

Dr. Hoyt proposes to testify to the fact and amount of damages caused by defendants’ alleged conspiracy. Dr. Hoyt’s opinion, according to his report dated March 27, 1995, is as follows: . . . [T]he fact and the extent of defendants’ supra competitive pricing can be measured by a “before and after” model which “generally compares defendants’ prices in two distinct time periods (conspiratorial and normative) and calculates the degree to which prices were raised and/or maintained at artificially high levels.” All parties agree that the “before and after” model is well accepted within the field of economics, and that it may be properly applied to determine the fact and the amount of damages in this case. The dispute is whether Dr. Hoyt indeed applied the “before and after” model, or whether his purported application is so fundamentally flawed as to render his conclusions inadmissible under *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, U.S., 113 S. Ct. 2786 (1993). . . . As noted, the “before and after” model requires that actual prices during the conspiracy period be compared to estimated competitive prices that would have prevailed during that period, absent the conspiracy. The model therefore required Dr. Hoyt to determine estimated prices that would have prevailed during the conspiracy period, based on prices that prevailed during the normative or non-conspiratorial period. . . .

In this case, Dr. Hoyt made the following findings and opinions concerning the estimated competitive prices that would have prevailed in the absence of a conspiracy:

- (1) Estimated competitive prices for the conspiracy period (January 1, 1988 through December 31, 1992) are the prices which prevailed during the normative

period (the ten consecutive months from January 1 through October 31, 1993); and (2) The sole cause of the actual price differences between the conspiracy period and the normative period was the conspiracy itself.

The two prongs of Dr. Hoyt's analysis are critical to plaintiffs' case and they are discussed, in detail, below.

Selection of January 1 to October 31, 1993 as the Normative Period

Plaintiffs' price-fixing claim is set against a stage of generally declining prices after 1980.... [P]rior to 1980, the aluminum phosphide industry was dominated by a legal patent. After the patent expired, new competitors entered the market. Prices fell steadily as the advantage of the original patent monopoly eroded and four new competitors ... gained market share. The overall decline in the selling price of aluminum phosphide progressed steadily and continuously from 1980 through October, 1993—except for a noticeable spike during roughly two quarters of 1990, coinciding with the admitted price-fixing episode by [several of the defendants].

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Dr. Hoyt's opinion is that absent a conspiracy, the prices which prevailed during the first ten months of 1993—the normative period—would have prevailed throughout each of the five preceding years, from January 1, 1988 through December 31, 1992.

* * *

Upon analysis, Dr. Hoyt's opinion is flawed in several obvious respects which render his conclusions irrelevant and inadmissible in this case:

First, Dr. Hoyt's opinion ignores the before component of the “before and after” model. Dr. Hoyt concedes that if pre-conspiracy data is available, the preferred scientific approach is to consult the data both before and after the conspiracy period. Under that approach, the economist has statistical bookends and may *interpolate* an estimated price line for any given conspiracy period instead of extrapolating an estimated price line from a single point in time. Although Dr. Hoyt had price information for all defendants for 1986 and 1987, his opinion does not address in any way the pre-conspiracy period. Therefore, Dr. Hoyt cannot account for the fact that prices before the alleged conspiracy are so substantially higher than the purportedly normal prices after the conspiracy.

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Dr. Hoyt's methodology in selecting a normative period is not sound. Scientific learning in the field of economics offers no defensible reason why a prudent economist would select January 1 through October 31, 1993 as the normative period in this case. Recognized methodology for distinguishing the alleged violation period from the alleged non-violation period requires analysis of price patterns and statistical tests, including a “dummy variable approach,” to determine whether for any proposed violation period the price was systematically higher than it would otherwise have been.⁷ Because Dr. Hoyt failed to perform this and other relevant analysis, his choice of a normative period is not consistent with accepted economic practice. To use Dr. Siegfried words, “the way he selected the benchmark is [not] consistent with the way an economist would do it.”

7. Dr. Siegfried applied the dummy variable approach to Dr. Hoyt's purported normative period, with surprising results. For two of the four companies on which Dr. Siegfried performed the dummy variable analysis, the statistical indicator method revealed that defendants' prices were actually *lower* than what would have been expected during the conspiracy period, January, 1988 through December, 1992. As a result, Dr. Siegfried concluded that Dr. Hoyt's benchmark period had “no basis.”

Cause of Price Differences between the Conspiracy Period and the Normative Period

... In applying the “before and after” model of damages, it is fundamentally necessary to explain the pattern of forces outside the violation period using factors that might have changed (*i.e.*, supply, demand, and differences in competition) to predict the prices during the conspiratorial period. In this context, as in most economic problems, failure to keep “other things equal” is one of the known “pitfalls ... in the path of the serious economist.” This case presents two potential normative periods, a “before” period and an “after” period that have distinctly different price levels. One therefore must identify the reasons for the disparate price levels. According to Dr. Siegfried, the field of economics supplies a statistical methodology for making this determination on a scientific basis, and the generally accepted means of predicting the prices that would have prevailed absent the conspiracy is regression analysis. At a minimum, regression analysis addresses supply and demand factors by looking at price trends over time. A prudent economist must account for these differences and would perform a minimum regression analysis if utilizing the “before and after” model.

Dr. Hoyt did not perform a regression analysis to address such obvious points as (1) why normative prices before the alleged conspiracy so greatly exceeded allegedly normative prices after the alleged conspiracy; or (2) the effect of supply, demand, competition or other factors that might impact price levels during both normative periods. Instead, Dr. Hoyt opined that any price increase between 1993 and the conspiracy period was caused solely by the alleged conspiracy. He took a simple weighted average of the actual prices for ten months during 1993 and assumed that price should have prevailed at all prior points in history. In doing so, Dr. Hoyt ignored price trends inside and outside the 1993 period, violating a fundamental rule of application for the “before and after” model. According to Dr. Siegfried, Dr. Hoyt’s calculations did not take into account the effect of four factors: (1) a precipitous decline in demand for aluminum phosphide pellets and tablets, with downward pressure on prices, after 1988; (2) increased competition, with downward pressure on prices, because of new entrants into the market; (3) marked realignment in position between 1990 and 1993, as newcomers to the market ... captured the majority of the pellets and tablets market, leaving the existing sellers to defend the residual market by reducing prices; and (4) the fact that the aluminum phosphide market is an oligopolistic market, characterized by interdependent pricing, in which no independent seller believes that its actions will be ignored by the other sellers....

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C. Conclusions of Law

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In *Daubert*, the United States Supreme Court held that Rule 702, in conjunction with Rule 104(a), requires the trial judge to act as gatekeeper to ensure that scientific expert testimony is both reliable and relevant. The court found that the term “scientific knowledge” establishes a standard of evidentiary reliability. The court noted that the adjective “scientific” implies a “grounding in the methods and procedures of science,” and the word “knowledge” means more than subjective belief or unsupported speculation and applies to any body of known facts or ideas inferred from such facts or accepted as truths on good grounds. The court concluded that in order to qualify as scientific knowledge, proposed expert testimony must be supported by appropriate validation, *i.e.*, good grounds based on what is known. ... Plaintiffs argue that *Daubert* applies only to “hard” physical sciences which may be tested by scientific method, not social sciences such as economics. *Daubert* indeed enumerates four non-exclusive non-dispositive factors which the Court may consider: (1) whether the scientific theory or technique can be (and has been) tested; (2) whether

the theory or technique has been subjected to peer review and publication; (3) known or potential rate of error; and (4) general acceptance in the scientific community. While each of these factors may not be relevant in determining the reliability of expert testimony on non-scientific or social science subjects, the Court has no doubt that *Daubert* requires it to act as a gatekeeper, to determine whether Dr. Hoyt's testimony and report are reliable and relevant under Rule 702. To the extent that *Daubert* factors are relevant to its determination, the Court considers them along with any other relevant factors.

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Here ... plaintiffs call upon Dr. Hoyt not to supply specialized knowledge, but to plug evidentiary holes in plaintiffs' case, to speculate, and to surmise. One does not need an expert economist to do what Dr. Hoyt proposes to do. A non-expert, using Dr. Hoyt's criteria, could pick as an equally valid normative period any arbitrary time period, of any length, occurring at any time after the date of the admitted conspiracy. Dr. Hoyt's analysis is driven by a desire to enhance the measure of plaintiffs' damages, even at the expense of well-accepted scientific principles and methodology. Nothing in Dr. Hoyt's analysis makes the data for his so-called "normative" period more relevant than the data for any other pre- or post-conspiracy period, and the record yields no factual basis for any hypothesis that will support his calculations and opinion. Similarly, a non-expert could *assume* that price-fixing accounts for all differences in price between the conspiratorial period and the normative period. To the extent that Dr. Hoyt purports to cast that assumption as an affirmative declaration based upon scientific reason and analysis, however, the Court must reject it. Dr. Hoyt's conclusions are scientifically unsound and irrelevant under *Daubert*.

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Notes and Questions

1. The Hired Gun: Dr. Hoyt's application of the "before and after" model was a poorly disguised attempt to increase the damages owed to the plaintiffs. Damages are supposed to be the difference between the actual price paid by the plaintiffs and the hypothetical price they would have paid "but for" the conspiracy. Obviously, the plaintiffs want to show that prices would have been much lower "but for" the conspiracy. In fact, the actual "before" prices were higher than the actual "after" prices. Not surprisingly, Dr. Hoyt opted for the lower "after" price, but Judge Vratil was not favorably impressed by the rigor of his analysis.

2. *Ceteris paribus*: Dr. Siegfried explained that Dr. Hoyt's approach was overly simplistic and did not take advantage of the standard economic techniques for investigating explanations for price changes. Market prices are determined by the interaction of supply and demand. The basic supply and demand model assumes that all forces that could impact market prices are held constant. This *ceteris paribus* assumption — *ceteris paribus* is the Latin phrase for "all other things held constant" — allows for the isolation and analysis of important variables. Unfortunately for Dr. Hoyt, the real world is more complicated — with numerous events impacting market prices at any given time. Economists have developed and applied statistical techniques to study the simultaneous impact of numerous changes on market prices. Thus, Judge Vratil simply held Dr. Hoyt to the professional standards of economists, as articulated by Dr. Siegfried.

3. *Econometrics and Multiple Regression Analysis*: Econometrics is the use of statistics to study and test economic phenomena. Multiple regression analysis is a statistical process

for making precise and quantitative estimates of the effects of different factors on some variable of interest. For example, the variable of interest in the present case is the market price of aluminum phosphide. Data about factors that would be expected to impact on market price—that is, the factors affecting market demand and supply—could be collected for the periods before, during, and after the conspiracy. For example, demand could be affected by the crop size at a particular time of the year; supply could be affected by a change in the cost of a major input into the aluminum phosphide production process, or by an increase in the number of competitors supplying the compound to the market. In effect, multiple regression analysis attempts to isolate the impact of one variable on the price of aluminum phosphide by holding everything else constant (the *ceteris paribus* assumption). In other words, multiple regression analysis is a statistically controlled experiment designed to estimate the impact of the conspiracy on market prices.

4. New Entrants: The entrance of new competitors (after the expiration of the patent) is one possible explanation for the decline in prices. Dr. Hoyt made no effort to isolate the impact of the new entrants. This type of incomplete economic analysis has been attacked in other cases. For example, Judge Posner has lamented the failure of an expert to segregate the effect of the entrance of a new competitor in the market from the effect of unlawful acts:

For years we have been saying, without much visible effect, that people who want damages have to prove them, using methodologies that need not be intellectually sophisticated but must not insult the intelligence. *Post hoc ergo propter hoc* will not do; nor the enduing of simplistic extrapolation and childish arithmetic with the appearance of authority by hiring a professor to mouth damages theories that make a joke of the concept of expert knowledge. The expert should have tried to separate the damages that resulted from the lawful entry of a powerful competitor . . . from the damages that resulted from particular forms of misconduct allegedly committed by that competitor. . . . No such effort was made.

Schiller & Schmidt, Inc. v. Nordisco Corp., 969 F.2d 410, 415–16 (7th Cir. 1992).

5. Scientific Methodology: “Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry.” *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593 (1993). Economic theory could have been used to generate hypotheses about the impact of the conspiracy on market prices, and econometric techniques could have been used to reject or accept the hypotheses. Dr. Hoyt failed to produce a report that took declining demand and new entrants in the market into account. Thus, Judge Vratil held that Dr. Hoyt’s testimony was “economically unreliable” and therefore inadmissible at trial. The court concluded that Dr. Hoyt’s testing procedures were not sufficient for his conclusions to be valid. Should experts be allowed to testify at trial to explain their testing procedures and assumptions or should they have to prove beforehand that their procedures are valid?

2. Efficiency and Other Normative Goals

Appreciation of the distinction between positive and normative analysis can help to clarify disputes about trade-offs between efficiency and other goals, such as equity.

Efficiency has many different meanings. Most non-economists are concerned with what economists call **productive efficiency**—are goods and services being produced at the lowest cost of production? If the answer is no, then we are wasting resources. Although productive

efficiency is an important concept, most economists' discussions of efficiency are concerned with **allocative efficiency**—are resources being allocated to their highest value use?

The traditional definition of allocative efficiency deals with whether a change in the allocation of some relevant economic resource creates more benefits than it does costs. If no possible changes in economic arrangements which result in greater benefits than costs can be identified, then it can be said that the wealth of society is maximized. However, the crucial question is whose costs and benefits are to be compared (and, maybe more critical for public policy considerations, how one measures “costs” and “benefits”). Of the two most commonly used formulations of the traditional definition, one takes a very individualistic approach, while the other takes a broader, more collective view.

The **Pareto efficiency** criterion is based on the belief that the individual is the best judge of his own welfare: a Pareto efficient allocation of resources (a particular state of the world) is one in which the welfare of any one member of society cannot be improved without reducing the welfare of any other member of society. If a change in the allocation of resources would result in greater benefit to one party than cost to another party, then one would expect to see a voluntary transaction take place to capture the gain—assuming the gain is greater than the costs of engaging in the transaction. If such a transaction takes place, it is considered to be **Pareto superior**—both parties are better off (or at least no worse off). Thus, the criterion of Pareto efficiency prevents external observers from assessing a change in policy by comparing the gain in welfare of one individual to the loss in welfare of another. The Pareto criterion would require the losing party to be compensated so that he is at least as well off as before the change occurred. Thus, in order to satisfy the Pareto criterion, there must be unanimity among the parties affected by any transaction. Any trade between consenting parties is considered Pareto superior, *ex ante*, since both parties believe they will be better off. An allocation in which all voluntary exchanges have taken place is Pareto efficient.

Another definition of efficiency is based on the **Kaldor-Hicks efficiency** criterion. A change is Kaldor-Hicks superior if those who gain from the change—for example, parties who gain from a tax change or from a change in a liability or property rule—could theoretically compensate those that have been harmed by the change and still have a net gain overall. The Kaldor-Hicks rule, which is often referred to as **cost-benefit analysis**, can be viewed as a quasi-Pareto rule—the gainers could compensate the losers, but they are **not** required to do so. Thus, in order to satisfy this cost-benefit efficiency standard, the harmed party does not actually have to be compensated for the harm that resulted from the policy change. The result is that changes in legal rules that meet the cost-benefit standard may involve non-compensated harms for some individuals. For example, the building of a new irrigation project may bring about benefits to farmers of \$100 million at the cost to taxpayers of \$75 million. This would be considered a Kaldor-Hicks superior move even though those who receive the benefits are not required to compensate the taxpayers.

The Kaldor-Hicks criterion is thought by planners to be a more practical basis for evaluating alternative public policies than the Pareto rule for the simple reason that the Pareto standard has severe informational requirements. Since it is virtually impossible to identify or measure all of the impacts of a change in legal rules, much of the impact being subjective and thus immeasurable, when most public policy analysts speak of efficiency, they mean Kaldor-Hicks efficiency. In general, when all potential changes that satisfy the criteria of Kaldor-Hicks efficiency are realized, then it is argued that resources are being allocated to their most highly valued uses. No one change can increase net benefits. Often, economic analyses of public policies are concerned with identifying the conditions under which changes that have net benefits can be achieved.

The term **equity** refers to the distribution of income or wealth among individuals. Both equity and efficiency are politically accepted as goals of public policies on various issues. In contrast to the allocative concerns of efficiency, equity is concerned with the “division of the pie,” rather than “maximizing the size of the pie.” Another way of stating the relationship between equity and efficiency is that equity addresses distributional issues, and efficiency addresses allocational issues. The discussion of Kaldor-Hicks efficiency illustrates some distributional considerations that may be involved in the analysis of changes in legal rules.

In many instances, equity and efficiency goals appear to be incompatible. The pursuit of either goal often involves costs in terms of reduced ability to pursue the other goal. The most straightforward example concerns a policy designed to impose an equitable distribution of income, where equitable is defined as equal. If everyone is entitled to the same income, the overall wealth of society will surely decline because there is no monetary reward for superior performance. The potential conflict between equity and efficiency arises in many areas of law and economics.

Positive economic analysis allows for the presentation of economic costs and benefits of alternative public policies; it does not require the analyst to impose his or her own value judgments. Understanding what is optimal from the perspective of allocative efficiency does not necessarily make it the “best” policy. In many areas, our political process has exhibited a willingness to sacrifice efficiency in order to further other social policies. The use of economic analysis can identify the magnitude of the allocative costs of a given policy before the trade-off is made.