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MARGINAL UTILITY AND THE COASE THEOREM

Herbert Hovenkamp†

I

INTRODUCTION: STRONG AND WEAK COASE THEORIES

Perhaps the single greatest intellectual event in the modern law & economics movement was the 1960 publication of Ronald Coase's *The Problem of Social Cost*,¹ a rare article that has become a landmark in the disciplines of both law and economics.

The Coase theorem can be stated in a number of ways. One perhaps most familiar to lawyers is something like this: "When bargaining costs are zero, the initial assignment of legal entitlements does not affect the efficiency of the resulting allocation of resources."² A more generalized version that applies in the presence of transactions costs is "The initial assignment of a legal entitlement does not affect the efficiency of the resulting allocation of resources, provided that the costs of bargaining are less than the difference in value that the bargaining parties place on the entitlement."

Suppose that the use of noisy equipment is worth \$100 to a confectioner but causes \$90 in injury to a neighboring physician.³ The efficient allocation of resources is continued operation of the confectioner's machinery, for this creates \$100 in value at a cost of only \$90. If the court forced the confectioner to stop using the machinery, the collective wealth of the two parties would be \$10 less. If no one else is affected by the injunction, the "social cost" as well as the private cost would be \$10—*i.e.*, society as a whole would be \$10 poorer.

But the Coase theorem says that the efficient allocation, contin-

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¹ Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960). The article is reprinted as ch. 5, pp. 95-156, in RONALD H. COASE, *THE FIRM, THE MARKET AND THE LAW* (1988). Citations are to the latter. See RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 19 (3d ed. 1986) (on importance of Coase article to origin of law and economics movement).

² Cf. Ronald H. Coase, *The Federal Communications Commission*, 2 J.L. & ECON. 1, 27 (1959) ("the delimitation of rights is an essential prelude to market transactions; but the ultimate result (which maximizes the value of production) is independent of the legal decision."); A. MITCHELL POLINSKY, *AN INTRODUCTION TO LAW AND ECONOMICS* 12 (1983) ("If there are zero transaction costs, the efficient outcome will occur regardless of the choice of legal rule.")

³ See *Sturges v. Bridgman*, 11 Ch.D. 852 (1879); R. COASE, *supra* note 1, at 105-06.

ued operation of the confectioner's equipment, will result whether or not the confectioner is held liable in nuisance, provided that the costs of striking a bargain are less than \$10. If the confectioner is liable, he will be willing to pay bargaining costs of, say, \$8 plus an additional \$91 to the physician to continue operating the machinery, and both confectioner and physician will be \$1 better off. If the confectioner is not liable, the physician will be willing to pay the confectioner only \$90 to stop using the machinery, but the confectioner will be unwilling to accept anything less than \$100. Once again, the confectioner will continue operating the machinery.

The efficient result will not necessarily obtain if transaction costs exceed \$10. If the confectioner is found liable and transaction costs are \$15, the confectioner must pay the physician at least \$90 plus the \$15 in transaction costs before the physician will agree to permit the machinery to operate. But the confectioner is unwilling to pay more than \$100.

The Coase theorem can also be stated more technically, as it was by George Stigler in 1966: "under perfect competition private and social costs will be equal."⁴ Coase himself observes that the "perfect competition" qualifier is unnecessary. A more technically correct statement is "with zero transaction costs, private and social costs will be equal."⁵ This formulation is another way of stating that social cost is nothing more than the sum of all private costs (including transaction costs). Social costs exceed private costs only when the costs of producing a bargain are so high that the market is unable to yield an efficient outcome. This might occur because there are too many bargainers, or the bargainers have imperfect information about relevant facts or the applicable law, or perhaps because they have opportunities to behave strategically. For example, if someone proposes to build a refining plant in a residential area, and the plant's smoke will injure 10,000 home owners, but each rather slightly, the costs of bargaining might prevent the plant owner from compensating the 10,000 for their losses (assuming the plant owner is liable), even though the value of operating the plant is greater than the losses imposed on the 10,000 home owners. Likewise, if the liability rule is uncertain and the parties have differing conceptions about what it is (*e.g.*, each thinks the other is legally obliged to bear the loss), then they will be less likely to strike a bargain and more likely to go to court. The court system is generally much more expensive than private bargaining.

The Coase theorem assumes that the legal entitlements at issue are alienable—*i.e.*, that the parties are free to contract around liabil-

⁴ GEORGE STIGLER, *THE THEORY OF PRICE* 113 (3d ed. 1966).

⁵ R. COASE, *supra* note 1, at 158.

ity or no-liability rules. Regulatory intervention that creates *inalienable* entitlements—for example, zoning that prohibits a refinery from building a plant whether or not the neighbors can be bought off—will not necessarily produce the efficient outcome.⁶

The Coase theorem can be said to consist of two sub-theses, or corollaries, an “efficiency” thesis and an “invariance” thesis. The efficiency thesis simply says that in the absence of transaction costs and externalities,⁷ two bargainers will achieve a Pareto efficient result. In general, this means that they will achieve a result that maximizes their joint wealth. The invariance thesis says that in the absence of transaction costs, the initial assignment of a transferable right will not determine who ends up with the right: the result will be the same no matter who received it to begin with. The most accurate statements of the Coase theorem include both theses. For example, Donald Regan’s statement is that “. . . in a world of perfect competition, perfect information, and zero transaction costs, [1] the allocation of resources in the economy will be efficient and [2] will be unaffected by legal rules regarding the initial impact of costs resulting from externalities.”⁸ In this case, [1] states the efficiency thesis and [2] the invariance thesis. Stating separate conditions of perfect information and zero transaction costs is unnecessary, since imperfect information is merely a kind of transaction cost.

The efficiency thesis and the invariance thesis do not necessarily stand or fall together. One might agree that private bargaining will generally produce efficient results, but deny that bargaining will produce *the same* efficient result regardless of how an entitlement is initially assigned.⁹ For example, the initial assignment of an entitlement may have *wealth effects* that ultimately will change the allocation of resources. The result of a change in a legal rule that formerly made ranchers liable to farmers for trespassing cattle but now places the loss on farmers is that the costs of ranching declines while the cost of farming rises. If both markets are competitive, we would expect a certain amount of entry into the ranching market and a certain amount of exit from the farming market. The result: when the liability rule changes the amount of activity changes as well.

For all its notoriety,¹⁰ both economists and those engaged in

⁶ See Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972).

⁷ *I.e.*, effects on people who are not parties to the bargain.

⁸ Donald H. Regan, *The Problem of Social Cost Revisited*, 15 J.L. & ECON. 427, 427 (1972).

⁹ See Robert Cooter, *The Cost of Coase*, 11 J. LEGAL STUD. 1, 15 (1982).

¹⁰ See Stewart Schwab, *Coase Defends Coase: Why Lawyers Listen and Economists Do Not*, 87 MICH. L. REV. 1171, 1189 (1989) (noting that as of that publication date *The Problem of Social Cost* was cited in 1109 articles listed in the *Social Science Index*); see also Fred R.

law and economics have had some difficulty characterizing the Coase theorem. Is it an empirical proposition? Is it a tautology? Is it a normative proposition (*i.e.*, neither purely descriptive nor purely analytic) that disguises an underlying bias against state interference in the market? A fair amount of literature, mainly on the left, argues that the Coase theorem is simply a normative statement reflecting a bias against State intervention in the free market.¹¹ A second body of literature begins with the premise that the Coase theorem is an empirical statement, and is therefore subject to verification or falsification. This literature examines real-world or hypothetical markets in order to determine whether the results that occur tend to support or undermine the theorem's predictions.¹²

A third argument is that the Coase theorem can be stated in two versions. A "strong version," which treats its claims as logically necessary, is that bargains *invariably* yield the results the theorem describes. A weaker version, which must be characterized as empirical, treats the theorem as a prediction that private bargaining will generally, but perhaps not invariably, yield these results. As Stewart Schwab notes, theorems are tautological; thus this weaker version is not really a "theorem" at all.¹³

Such discussions of the scientific status of the Coase theorem

Shapiro, *The Most-Cited Law Review Articles*, 73 CALIF. L. REV. 1540, 1546 (1985) (noting that the Coase article is clearly among the most cited although it was excluded from this study since it was published in an interdisciplinary journal).

¹¹ *E.g.*, C. Edwin Baker, *The Ideology of the Economic Analysis of Law*, 5 PHIL. & PUB. AFF. 3 (1975); Owen M. Fiss, *The Death of the Law?*, 72 CORNELL L. REV. 1 (1986); Donald H. Gjerdingen, *The Politics of the Coase Theorem and its Relationship to Modern Legal Thought*, 35 BUFFALO L. REV. 871 (1986); Morton J. Horwitz, *Law and Economics: Science or Politics?*, 8 HOUSTON L. REV. 905, 906, 911-12 (1980); Mark Kelman, *Consumption Theory, Production Theory, and Ideology in the Coase Theorem*, 52 S. CAL. L. REV. 669, 673-78 (1979); see also Barbara White, *Coase and the Courts: Economics for the Common Man*, 72 IOWA L. REV. 577 (1987). But see Pierre Schlag, *An Appreciative Comment on Coase's The Problem of Social Cost: A View from the Left*, 1986 WIS. L. REV. 919 (arguing that although Coase's original article was more-or-less noncommittal on ideological questions, it has been "captured" by the right wing of the law and economics movement).

¹² *E.g.*, Robert C. Ellickson, *Of Coase and Cattle: Dispute Resolution Among Neighbors in Shasta County*, 38 STAN. L. REV. 623 (1986); Glenn W. Harrison & Michael Mckee, *Experimental Evaluation of the Coase Theorem*, 28 J.L. & ECON. 653 (1985); Elizabeth Hoffman & Matthew L. Spitzer, *Entitlements, Rights, and Fairness: An Experimental Examination of Subjects' Concepts of Distributive Justice*, 14 J. LEGAL. STUD. 259 (1985) [hereinafter Hoffman & Spitzer, *Entitlements*]; Elizabeth Hoffman & Matthew L. Spitzer, *The Coase Theorem: Some Experimental Tests*, 25 J.L. & ECON. 73 (1982) [hereinafter Hoffman & Spitzer, *The Coase Theorem*]; Stewart Schwab, *A Coasean Experiment on Contract Presumptions*, 17 J. LEGAL STUD. 237 (1988); see also John Donohue, *Diverting the Coasean River: Incentive Schemes to Reduce Unemployment Spells*, 99 YALE L.J. 549, 549 (1989) (suggesting that the value of the Coase Theorem depends on "the extent to which [it] is empirically validated."); George J. Stigler, *Two Notes on the Coase Theorem*, 99 YALE L.J. 631, 631 (1989) (suggesting that the "logic" of the Coase Theorem is not testable, but its domain might be); Kenneth R. Vogel, *The Coase Theorem and California Animal Trespass Law*, 16 J. LEGAL STUD. 149 (1987).

¹³ See Schwab, *supra* note 10, at 1176.

generally fail to disaggregate the statement of the theorem from its premises. The theorem appears to be genuinely deduced from its premises—namely, freely alienable entitlements, zero transaction costs, no wealth effects, and profit maximizing actors. If the premises are true in any given situation, the Coase theorem must predict the result. Thus it is easy to make too much of the distinction between strong and weak versions of the Coase theorem. Failure of the Coase theorem to account for a real world outcome is simply an observation that (1) an entitlement is not freely alienable; (2) transaction costs are higher than anticipated; (3) the actors are not profit-maximizers; or (4) wealth effects undermine the invariance thesis—*i.e.*, in a given situation one of the premises does not obtain.

For example, the Pythagorean theorem states that the square of the hypotenuse of a right triangle equals the sum of the squares of the two legs. We do not speak of “strong” and “weak” versions of the Pythagorean theorem simply because some of the things that we encounter in the real world that have been characterized as right triangles do not precisely measure up. The weak version would be “Most of the time the square of the hypotenuse of a right triangle equals the sum of the squares of the two legs.” Rather, we check our real world triangle for evidence that (1) it is not precisely a right triangle; or (2) it is not a triangle at all because one of the three sides is slightly curved or has a kink.

I believe the Coase theorem can and should be stated as a theorem (strong version) rather than an empirical proposition (weak version),¹⁴ although as stated in the literature cited above one of its premises is missing. I would modify Don Regan’s statement to say “in a world of zero transaction costs, and no wealth effects, the allocation of resources in the economy will be efficient and will be unaffected by legal rules regarding the initial impact of costs resulting from externalities.” Zero transaction costs implies perfect information, since imperfect information is simply a cost of bargaining. The assumption of no wealth effects is necessary because, as Regan himself notes, in the long run cost-shifting rule changes will cause investment in the side of the market where costs are reduced, and divestment from that side where costs are increased. As is argued below, the possibility of strategic bargaining, much discussed in the literature, does not undermine this statement of the theorem.¹⁵ Inefficient strategic bargaining is simply inconsistent with the assumptions of perfect information and zero transaction costs.

¹⁴ For statements that the Coase theorem is tautological, see Guido Calabresi, *Transactions Costs, Resource Allocation, and Liability Rules—A Comment*, 11 J.L. & ECON. 67, 68 (1968); Vogel, *supra* note 12, at 186.

¹⁵ See *infra* text accompanying notes 26-29.

If the Coase theorem is indeed a theorem, then it does not come in a "weak" version. As a result, one cannot conduct empirical "tests" of the Coase theorem—no more than one could conduct empirical tests of the Pythagorean theorem. A supposed empirical test of the Coase theorem is nothing other than a test of the degree to which one or more of its premises obtains or fails to obtain in a particular situation.

Treating the Coase theorem as an empirical proposition creates another problem. At least one of its assumptions—namely, that relevant actors seek to maximize profits—may not itself be capable of empirical verification, and probably must be classified as normative. Some writers have attributed failures of the Coase theorem to predict real world outcomes to high transaction costs. I argue below that failure of the relevant actors to maximize profits is frequently a much more plausible explanation.¹⁶ In particular, the Coase theorem does not predict very well when applied to individuals acting as consumers, rather than producers. This is so for two reasons. First, to the extent individuals experience declining marginal utility of income, their reservation prices for purchases and sales are not the same. Second, individuals maximize utility, not wealth; and the utility maximizing outcome is not necessarily the same as the allocatively efficient outcome.

II

ASSUMPTIONS, STRATEGIC BEHAVIOR AND TESTABILITY

A. The Weak Version of the Coase Theorem and the Possibility of Strategic Behavior in the Division of Surplus Value

When the Coase Theorem's assumptions obtain, any transaction that produces a surplus (*i.e.*, any efficient transaction) will occur. A surplus exists if the party holding an entitlement places a lower value on it than a party who does not hold it. The theorem says nothing explicit about how the surplus will be divided, and the assumption of profit-maximizing actors suggests that each bargainer will attempt to have as much of the surplus as possible.

Hoffman and Spitzer, who have conducted several empirical tests of the Coase theorem, list the following as its preconditions:¹⁷

- (a) two agents to each externality (and bargain), (b) perfect knowledge of one another's (convex) production and profit or utility functions, (c) competitive markets, (d) zero transactions costs; (e) costless court system, (f) profit-maximizing producers and ex-

¹⁶ See *infra* text accompanying notes 32-69.

¹⁷ Hoffman & Spitzer, *The Coase Theorem*, *supra* note 12, at 73.

pected utility-maximizing consumers, (g) no wealth effects, (h) agents will strike mutually advantageous bargains in the absence of transactions costs.

Their (a) is equivalent to my (1), described in Section B, *infra*. Their (c), competition, is not necessary,¹⁸ was not present in most of the markets that Coase used as examples (most were bilateral monopolies), and is not present in many of the interesting experiments that Hoffman and Spitzer themselves create.¹⁹ Preconditions (b), (d), and (e) are all parts of the same assumption, namely, that bargaining is costless, as Hoffman and Spitzer later note.²⁰ Assumption (g) is necessary because almost everyone²¹ now concedes that if there are nontrivial wealth effects over the long run there will be more investment in the side of the market where costs are reduced, and less in the side of the market where costs are increased. Thus the amount of an activity will be affected by a change in the liability rule, and the invariance thesis will not apply.²²

Preconditions (f) and (h) appear to be the same thing, but Hoffman and Spitzer argue that both are necessary. Profit or utility maximizing agents (f), they argue, guarantee only "individual" rationality, not a mutually advantageous "group" outcome.²³ The one place that individually rational profit-maximizing behavior may not yield a socially optimal result is when strategic behavior occurs as people try to obtain the largest possible share of the surplus. For example, in the case of the confectioner and the physician discussed earlier,²⁴ the confectioner will pay the physician some amount between \$90 and \$100 for the right to operate his machinery. Whether the amount is closer to \$90 or to \$100 is indeterminate under the Coase theorem, and may depend on the parties' bargaining skills. Good bargaining may involve threats of inefficient behavior. Donald Regan argues that if firm bargaining strategies include threats to do inefficient things, the threats will be credible only if people occasionally carry them out. As a result, at least some efficient bargains will fail to be struck, or suboptimal bargains

¹⁸ Coase acknowledges this. See *supra* text accompanying note 5.

¹⁹ See *infra* text accompanying notes 41-49.

²⁰ Hoffman & Spitzer, *The Coase Theorem*, *supra* note 12, at 74.

²¹ That is, almost everyone except Coase himself, who argues that under perfect information people would write contracts that took the risk of changes in legal rules into account. See R. COASE, *supra* note 1, at 171; Schwab, *supra* note 10, at 1180.

²² See Cooter, *supra* note 9, at 15 n.13.

²³ Hoffman & Spitzer, *The Coase Theorem*, *supra* note 12, at 75 n.8 ("The Coase Theorem also needs an assumption which provides for combining individually rational behavior into a group outcome.").

²⁴ See *supra* text accompanying note 3.

created.²⁵

Scholars who have approached the Coase Theorem as an empirical statement have assumed that strategic behavior of bargainers will sometimes result in an uneven division of this surplus between the bargainers. This section argues that the Coase theorem predicts equal division of the surplus. Strategic behavior successfully giving one party more than half of the surplus is inconsistent with the premises of profit-maximization and perfect information. The argument here applies both to situations involving only a single bargain, and to situations in which the parties might make multiple bargains and have information about all of them. As a result, Hoffman and Spitzer's assumption (h) is unnecessary. Further, Donald Regan's suggestion that some inefficient transactions will fail to occur because a strategic bargainer will occasionally carry out a threat to walk away from a profitable bargain is inconsistent with the theorem's assumptions. This will not happen if the parties have perfect information and both parties are profit-maximizers. In short, efficient bargains will always occur.

Strategic behavior comes in two general kinds. One kind involves "bluffing," or giving the other side misleading information about one's own position, as in a poker game. But this kind of strategic behavior is inconsistent with the assumption of perfect information. Another kind of strategic behavior is the threat to behave irrationally: *i.e.*, to do something that is not profit-maximizing for the strategist but that imposes losses on the opponent as well, such as walking away from a profitable bargain. But, once again, the theorem assumes both perfect information and profit-maximizing participants. If I have perfect information, this includes information about the assumed fact that my bargaining partner is a profit-maximizer, just as I am. My opponent's threat to abandon a potentially profitable bargain will not be credible, and we will divide the surplus. Inefficient strategic behavior seems inconsistent with the strict premises of perfect information and individual profit maximization. To the extent information is less than perfect, of course, inefficient strategic behavior becomes possible.

One situation stated as an exception²⁶ is that strategic behavior might become possible when the strategist is involved in many transactions, and his bargaining partners have information about all of them. The strategist might always threaten to walk away unless he receives a larger share of the surplus, and he might occasionally walk away in order to make his threats credible. This multi-bargain

²⁵ Regan, *supra* note 8, at 429-30; *cf.* Cooter, *supra* note 9, at 18; Schwab, *supra* note 10, at 1175-77.

²⁶ See Cooter, *supra* note 9, at 17-29; Regan, *supra* note 8, at 429-30.

strategy might be profitable for him if the larger shares of the surplus he obtains from the sum of the successful trades outweigh his losses from the occasional trade where he carries out his threat. This creates a prisoners' dilemma situation. If all the strategist's opponents held firm in insisting on half of the surplus, the strategy would not work. But, acting individually, each opponent might find it individually maximizing to complete the bargain and take less than half of the surplus, rather than risk not completing the bargain at all and losing all the surplus.

But even this strategy would not work under perfect information. Suppose, for example, that strategist *S* had five bargaining partners, *A*, *B*, *C*, *D*, and *E*. In each case a successful transaction would produce a surplus of \$4. For example, *A-E* each own an entitlement that they value at \$16 and that *S* values at \$20. *S* wishes to purchase these entitlements at less than \$18, which would be an equal division of the surplus, so he threatens each individual bargainer that he will walk away unless the bargainer agrees to accept, say, \$17 for her entitlement. In order to make his threat credible, *S* must walk away from at least one bargain. In this case, if he walks away from one, he will obtain \$12 in surplus (4 transactions at \$3 surplus each). Under an equal division of the surplus *S* would obtain only \$10 (5 transactions at \$2 surplus each).

Under what circumstances will *A*, *B*, *C*, *D* or *E* yield to this threat? If they know that *S* walks away from one-fifth of his bargains, then the cost of a lost bargain is the ordinarily expected half of the surplus, or \$2, multiplied by the probability that the bargain will be lost, or .2. The anticipated cost of a lost bargain is thus 40 cents, but the price for avoiding this risk by accepting the strategist's offer is \$1. A profit maximizing, risk-neutral trader will accept the risk of the 40 cent loss and hold out for a division of the surplus.

When will the trading partner give up the surplus because the risk of a lost bargain is too high? Only when the risk-adjusted cost of a lost bargain is equal to or greater than the \$1 surplus that he is asked to give up. But in the above example that would be true only if *S* walked away from half his bargains.²⁷ If he walked away from that many bargains, the losses on these would far more than offset the gains made on the others. As a generalized proof in the note shows,²⁸ there are no circumstances under which the strategist can

²⁷ *I.e.*, the loss of the bargain would cost the trader \$2, and the strategist is demanding a trade that gives the trader only \$1. Since there are five trades, the strategist would have to walk away from half of them to create a risk-adjusted cost of \$1.

²⁸ Assume that strategist *S* engages in a set of *n* transactions with multiple trading partners. There could be a different trading partner for each transaction, or one trading partner could be involved in more than one of these transactions. In each case the surplus is *X*, and *S* threatens to walk away from any bargain unless *S* receives more than .5*X*

profitably threaten to walk away from a bargain, assuming that the trading partner is risk neutral. Importantly, it is not even necessary for the trading partner to know the probability that the strategist will walk away from a profitable bargain. He need know only that (1) the strategist's long-term goal is profit-maximization;²⁹ and (2) *no possible* strategy of walking away from profitable trades can maximize the strategist's profits, if each trading partner computes the risks accurately. As a result, strategic bargaining designed to give the strategist a larger share of the surplus is inconsistent with either of the premises: that both participants have perfect information or that both participants are profit maximizers.

Hoffman and Spitzer give other examples of situations where people might fail to strike efficient bargains.³⁰ But these are idiosyncratic, involving such things as people who believe that cows are sacred, and thus may place noneconomic values on them. In any event, such facts are inconsistent with the profit-maximization assumption: a business firm that believes cows are sacred and keeps

as its share of the surplus. To make the threat credible, *S* occasionally, but unpredictably, walks away from a bargain.

This strategy will be profitable to *S* only if:

$$(1) \quad (.5X + P)(n - Q) > .5Xn$$

Where,

P is the amount of surplus in excess of .5*X* that *S* asks for;

and

Q is the number of times that *S* carries out the threat—*i.e.* walks away from a transaction that would have created surplus *X*.

But for any trading partner engaged with *S* in one of these transactions, say *A*, acceding to the threat will be profitable only if the amount of surplus *A* gives up by acceding to the threat (*P*) is less than the anticipated cost of the risk that the transaction will not occur

$$(2) \quad P < .5X(Q/n)$$

Solving (1) for *Q*:

$$(1a) \quad .5Xn + Pn - .5XQ - PQ > .5Xn$$

$$(1b) \quad Pn - .5XQ - PQ > 0$$

$$(1c) \quad Pn - PQ > .5XQ$$

$$(1d) \quad (Pn - PQ)/.5X > Q$$

Solving (2) for *Q*:

$$(2a) \quad Pn < .5XQ$$

$$(2b) \quad Pn/.5X < Q$$

$$(2c) \quad Q > Pn/.5X$$

Combining (1d) and (2c) yields:

$$(Pn - PQ)/.5X > Pn/.5X$$

So:

$$Pn - PQ > Pn$$

Which means that $PQ < 0$. Either *P* or *Q* must be a negative number. Since *Q* (the number of times the threat is carried out) cannot be negative, *P* must be. In short, the risk-adjusted cost of a threat not to bargain is greater than the lost surplus only when the "surplus" the strategist is demanding is a negative number.

²⁹ That is, the strategist's goal is to maximize the sum of profits made on all trades, not necessarily to maximize the profits earned on each trade individually.

³⁰ Hoffman & Spitzer, *The Coase Theorem*, *supra* note 12, at 75 n.8.

large numbers of them even though it is costly to do so is simply not maximizing its profits.

B. The Strong Version of the Coase Theorem

The strong, or logically necessary version of the Coase theorem can be described in this way:

Assumptions:

(1) *Two traders, A and B, are in a position to bargain freely for ownership of an alienable reciprocal entitlement, P.*

A and B may be either individuals, firms, or groups of similarly situated individuals or firms, such as the large group of land owners surrounding the polluting refinery. Which they are does not change the analysis. Of course, larger groups can generate larger contracting costs. As the number of persons or firms increases, transaction costs generally increase as well.

An "alienable reciprocal entitlement" is a transferable relationship expressed in the common law dichotomies of "liability/no-liability" or "right/duty," that exhausts all possibilities with respect to its domain. For example, Rancher A's right that one of his cows may graze on Farmer B's land is a reciprocal entitlement. Assigning the entitlement to A means that the cow may graze free from liability to B for damages; assigning it to B means that the cow may not graze free from liability. To say that the reciprocal entitlement is alienable means merely that if A has the entitlement, B may purchase it from him, or vice-versa.

(2) *Both A and B are profit maximizers.*

This means that for any alienable reciprocal entitlement P, currently held by B, A will purchase P at price X if P's profitability to A is greater than X. A will not purchase P at price X if P's profitability to A is less than X. Likewise, for any entitlement P currently held by A, A will sell P to B at price Y if the profitability of P to A is less than Y. A will not sell P to B at price Y if the profitability of P to A is greater than Y. These assumptions are reciprocal, in that they must apply equally to decisions made by B.

(3) *Transaction (bargaining) costs are C, and must be borne by the parties to any bargain.*

"Transaction costs" here refer to all costs, including costs resulting from less-than-perfect information. An assumption of zero transaction costs implies that information is perfect.

(4) *A forced transfer of an alienable reciprocal entitlement has no wealth effects; or if it has wealth effects these are fully accounted for by the parties in the bargaining process.*

The Coase Theorem says that:

(1) If $C = 0$, A values P at X, B values P at Y, and $X > Y$, A will retain P if he already has it or will purchase it from B if B currently has it.

(2) If $C = 0$, A values P at X, B values P at Y, and $X < Y$, A

will sell P to B if A currently has it; but A will not purchase P from B if B currently has it.

More generally:

(3) If $C = N$, A values P at X , B values P at Y , and $X > Y$ but $(X - Y) < N$; then A will retain P if he already has it, but will not purchase it from B if B currently has it.

(4) If $C = N$, A values P at X , B values P at Y , $X > Y$ and $(X - Y) > N$, then A will retain P if he already has it or purchase it from B if B currently has it.

The four conclusions of the Coase Theorem stated above follow deductively from the four given assumptions. Any empirical observation that a reciprocal entitlement is not in the hands of the person who values it most highly can only be explained by one of these possibilities: (1) the parties are not able to bargain freely about the entitlement; (2) the parties are not profit-maximizers; (3) bargaining costs, including the costs of imperfect information, exceed the difference in value of the entitlement to the two parties.

Whether the firms are objectively free to bargain should ordinarily be a matter of simple empirical observation. Of course, firms or other organizations might not be "free" to bargain because of hidden internal disputes about authority or policy. But the existence of such inefficiencies inside the firm would go to the question of profit maximization rather than objective ability to bargain. As to bargaining costs, these costs may be difficult to measure—particularly in the bilateral monopoly situation to which the Coase theorem was historically applied.³¹

C. Why Does the Coase Theorem Fail to Predict?

One important conclusion that follows from the observation that the Coase theorem is analytic is that one cannot conduct "empirical tests" of the theorem itself, but only of the degree to which one or more of its assumptions might fail to obtain in a given situation. Conducting empirical tests of the Coase theorem is like conducting empirical tests of the Pythagorean theorem. Given the theorem's assumptions, the results flow out as a matter of logical necessity.³²

Studies of markets in which the Coase theorem appears not to work very well have generally attributed the result to high, but indeterminate, transaction costs.³³ The general notion of a "market fail-

³¹ See, e.g., 2 PAUL SAMUELSON, *THE COLLECTED SCIENTIFIC PAPERS OF PAUL A. SAMUELSON* 1411 (1966) (on difficulties of bargaining in the bilateral monopoly situations illustrated by *The Problem of Social Cost*). For a contrary view, see Richard D. Friedman, *Antitrust Analysis and Bilateral Monopoly*, 1986 WIS. L. REV. 873.

³² See *supra* text accompanying note 13.

³³ E.g., Ellickson, *supra* note 12, at 628, 686.

ure" is that in certain markets private bargaining will not yield the optimal result because transaction costs, in some sense, are too high. For example, Vogel concludes that "in a zero transaction cost world the Coase theorem would be verified, as it is tautologically true. Any failure of the theorem would always be due to the existence of transaction costs."³⁴

Most of those discussing the perceived failure of the Coase theorem to predict in a particular market have *not* attributed the result to one or both bargainers' failure to maximize profits. There are at least two reasons for this. First, the question of firm profit-maximization is generally considered to be firm-specific, rather than market specific. That is, assuming there are firms that do not maximize profits, they are probably scattered through all markets; thus, if the theorem works in market A but not in market B, we want an explanation that distinguishes these two markets as markets. However, as a later section argues,³⁵ sometimes failure of profit-maximization may be inherent in the market. This is likely to occur when at least one participant is a utility-maximizing consumer rather than a profit-maximizing business firm.

A second reason that failure to maximize profits is not offered to explain apparent failures of the Coase theorem is that, while transaction costs at least in principle are empirically measurable, profit-maximization is not. In fact, the general proposition that firms maximize profits is probably not capable of being verified, for any test would produce too many counterexamples.³⁶ The evidence is equally consistent with alternative theories, such as maximization of output³⁷ or revenue,³⁸ "satisficing," or some other measure that maximizes the utility of the managers rather than the profits of the shareholders.³⁹ For example, the widespread use by managers of

³⁴ Vogel, *supra* note 12, at 186.

³⁵ See *infra* text accompanying notes 50-62.

³⁶ See Lawrence A. Boland, *On the Futility of Criticizing the Neoclassical Maximization Hypothesis*, 71 AM. ECON. REV. 1031 (1981); Bruce J. Caldwell, *The Neoclassical Maximization Hypothesis: Comment*, 73 AM. ECON. REV. 824 (1983).

³⁷ OLIVER E. WILLIAMSON, *THE ECONOMICS OF DISCRETIONARY BEHAVIOR* 85-126 (1968); John Williamson, *Profit, Growth and Sales Maximization*, 34 *ECONOMICA* 1 (1966); Robert E. Wong, *Profit Maximization and Alternative Theories: A Dynamic Reconciliation*, 65 AM. ECON. REV. 689 (1975).

³⁸ *E.g.*, WILLIAM J. BAUMOL, *BUSINESS BEHAVIOR, VALUE AND GROWTH* ch. 6 (1967); Leland, *The Dynamics of a Revenue Maximizing Firm*, 13 *INT'L ECON. REV.* 376 (1972).

³⁹ *E.g.*, ADOLF BERLE & GARDINER C. MEANS, *THE MODERN CORPORATION AND PRIVATE PROPERTY* (1932) (inefficient managerial incentives result from separation of ownership and control); W. BAUMOL, *supra* note 38 (sales maximization); ROBIN MARRIS, *THE ECONOMIC THEORY OF "MANAGERIAL" CAPITALISM* (1964) (maximization of growth rate); HERBERT A. SIMON, *RATIONAL DECISION MAKING IN BUSINESS ORGANIZATIONS* (1978) (bounded rationality and satisficing, or the seeking of performance that satisfies minimum expectations in a variety of areas); OLIVER E. WILLIAMSON, *THE ECONOMICS OF DISCRETIONARY BEHAVIOR: MANAGERIAL OBJECTIVES IN A THEORY OF THE FIRM* (1967)

“poison pills” or other devices to thwart takeover attempts suggests that firms’ managers often behave in ways that are not calculated to maximize the profits of their firm. The efficient market hypothesis suggests that firms are taken over when they are performing inefficiently, and that takeovers tend to assign firms to more efficient managers. A manager who was seeking to maximize stockholder profits would be inclined to permit the firm to be taken over if it performed inefficiently.⁴⁰ If firms do not behave in such a way as to maximize profits in a given situation, the Coase theorem cannot be shown to apply. That is, firms may sometimes walk away from efficient bargains, such as acquisitions that increase the wealth of the firm, although at the expense of managers, who might lose their jobs.

Hoffman’s and Spitzer’s empirical tests⁴¹ probably came as close to any in creating a situation where transaction costs are zero. Each person had complete information about the other’s objective position. The bargains were simple and one-dimensional. The rules were simple and were apparently understood by the parties. It is difficult to imagine a real world market with lower transaction costs.

But the experiments of Hoffman and Spitzer, as well as of others who have followed them,⁴² have not been well calculated to test the profit-maximization or utility-maximization hypothesis. The experiments themselves implicitly identified the object of the market game at issue as profit-maximization. Those administering the experiments instructed participants that “If you follow the instructions carefully you might earn a considerable amount of money.”⁴³ But the fact that a person pinches pennies to win says nothing about whether he, on the whole, is a profit-maximizer. Presumably, most people prefer more money to less if nothing else is to be traded away. The experimental tests of the Coase theorem effectively created a situation in which there was little or nothing to be traded away and found that, under such circumstances, people played a money game to win. An important problem of such tests is that

(institutional constraints on efficient behavior); Harvey Leibenstein, *Allocative Efficiency vs. “X-Efficiency”*, 56 AM. ECON. REV. 392 (1966) (failure of internal accountability schemes to minimize costs). Other literature is discussed in F.M. SCHERER, *INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE* 33-38 (1987).

⁴⁰ See Frank H. Easterbrook & Gregg A. Jarrell, *Do Targets Gain from Defeating Tender Offers?*, 59 N.Y.U. L. REV. 277 (1984); Robert Smiley, *Tender Offers, Transaction Costs, and the Theory of the Firm*, 58 REV. ECON. & STATISTICS 22 (1976).

⁴¹ See Hoffman & Spitzer, *Entitlements*, *supra* note 12, at 259; Hoffman & Spitzer, *The Coase Theorem*, *supra* note 12, at 73.

⁴² E.g., Harrison & McKee, *supra* note 12, at 653.

⁴³ Hoffman & Spitzer, *The Coase Theorem*, *supra* note 12, at 83; Harrison & McKee, *supra* note 12, at 666.

profit-maximization is either specified *ex ante*, or else there are no competing considerations that compromise each participant's desire to maximize profits. If profit-maximization is specified or assumed, and the profit-maximization hypothesis is the only interesting empirical hypothesis to be tested, then the test has assumed the conclusion.

III

THE COASE THEOREM IN THE ABSENCE OF PROFIT-MAXIMIZATION: THE PROBLEM OF CONSUMER BEHAVIOR

Neoclassical economic theory assumes that business firms seek to maximize profits. Although the assumption that firms *invariably* seek to maximize profits is not empirically provable, and probably is false,⁴⁴ a less robust version of the statement might be true—such as firms try to maximize profits *generally*, or more often than not. The empirical weakness in the firm profit-maximization hypothesis has not bothered most neoclassical economists very much. First of all, the assumption is so critical to model building that neoclassical economics could not survive in its present form without it. Second, models based on competition *prefer* that firms maximize profits. This preference gives the profit-maximization premise a character that is more normative than positive.

But individuals acting as consumers do not seek to maximize profits. They seek to maximize utility. This fact can undermine application of the Coase theorem for two different reasons: (1) most people experience decreasing, not constant, marginal utility of income; (2) wealth is only one ingredient in the utility functions of most people.

This divergence between individual utility functions and individual wealth functions accounts for many of the inconsistent results in empirical tests of the Coase theorem—particularly those that call the invariance thesis into question. All of Coase's examples in *The Problem of Social Cost* involved profit-maximizing business firms. Many of the empirical tests have involved utility maximizing consumers—or, in some cases, such as the work of Ellickson⁴⁵ and Vogel,⁴⁶ people who were acting simultaneously in their capacity as profit-maximizing producers and utility-maximizing consumers.⁴⁷

In their original experiments on the Coase theorem, Hoffman and Spitzer defined one of the conditions of the Coase theorem as

⁴⁴ See *supra* text accompanying notes 36-40.

⁴⁵ Ellickson, *supra* note 12.

⁴⁶ Vogel, *supra* note 12.

⁴⁷ See *infra* text accompanying notes 65-67.

“profit-maximizing producers and expected utility-maximizing consumers,”⁴⁸ thus suggesting that they were going to take both profit-maximization and utility maximization into account. However, the experiments were set up so that maximization of a cash payout was identified as the maximizing, or efficient, solution. That is, utility maximization was either not accounted for at all, or utility maximization and profit maximization were assumed to be identical. The tests were contrived in such a way that the marginal utility of income (“payoff,” in the experiment) was constant, and the object of the experiment was to maximize the payoff. In short, the experiments duplicated, as closely as possible, the situation of two profit-maximizing firms bargaining around a legal entitlement. In the experiment two or more bargainers were given numbers,⁴⁹ to each of which was assigned a “payoff.” However, the payoff of any number was different for each bargainer. One bargainer, the controller, was equivalent to the person with the legal entitlement. The controller was permitted to select a number and the other participant to make side payments to the controller to influence his choice. The tests found that in a great majority of cases the parties selected the payoff that produced the maximum dollar return to the two parties. This maximum dollar return was identified as the efficient result.

A. The Coase Theorem Under Declining Marginal Utility of Income

Most people probably experience declining marginal utility of income—each dollar added to their wealth gives them a marginally lower level of individual satisfaction than a previous dollar.⁵⁰ This proposition is difficult to test, but there is certainly evidence that supports it. For example, most people purchase loss insurance on moderately valuable things like their automobiles even though the expected value of any loss is substantially less than the insurance premium—*i.e.*, the cost of insurance is *at least* the cost of the expected risk plus the transaction costs of creating and marketing the insurance. People purchase insurance because the marginal utility per dollar of, say, \$100 taken out of their income as insurance premiums, is far less than the marginal utility per dollar of, say, \$10,000

⁴⁸ Hoffman & Spitzer, *The Coase Theorem*, *supra* note 12, at 73.

⁴⁹ On experiments with two and three bargainers, see Hoffman & Spitzer, *The Coase Theorem*, *supra* note 12. On experiments with larger numbers of bargainers, see Elizabeth Hoffman & Matthew L. Spitzer, *Experimental Tests of the Coase Theorem with Large Bargaining Groups*, 15 J. LEGAL STUD. 149 (1986). The first to observe that the Coase theorem could apply equally to large groups of bargainers was Calabresi, *supra* note 14, at 68.

⁵⁰ See GORDON TULLOCK, *ECONOMICS OF INCOME REDISTRIBUTION* 21 (1983) (“almost everyone has agreed that above a very low point monetary income is subject to declining margin of returns.”).

taken out of their income if they should have to replace a destroyed vehicle. The \$100 comes out of their income at the margin, and competes with savings account, nights at the movies or additional toys for the children. But the \$10,000 loss, should it occur, would threaten mortgage or rental payments, food, clothing or other things that they consider to be more important.

Several people have observed an apparent anomaly in the Coase theorem that shows up in consumer evaluations of products or services: people seem to measure value very differently depending on whether they are "buying in" or "selling out." For example, in some experiments people were asked to assume that a factory belched smoke that obstructed a beautiful view from their home. They were then asked two questions: (1) assuming that the factory had the right to produce the smoke, how much would you pay the factory not to do it? and (2) assuming that the factory did not have the right to produce the smoke, how much would the factory have to pay you for the right to produce it?⁵¹ The answers showed consistently that the amount in (2) was substantially higher than the amount in (1). To the extent this is true the "invariance" corollary of the Coase theorem—*i.e.*, that the initial assignment of a right does not effect the outcome—may not apply when one of the bargainers is a consumer.

More recent tests in both hypothetical⁵² and real markets have tended to confirm and even strengthen this result. In a recent empirical study two sets of subjects were presented a harmless but extremely foul tasting fluid, which they were to place in their mouths for 20 seconds.⁵³ One group was told that the fluid would be placed in their mouths unless they bid successfully for an entitlement not to be subjected to the fluid. A second group was told that they would

⁵¹ In the literature of welfare economics, this is generally defined as the problem of compensating and equivalent variations. A compensating variation is the amount of money a person is willing to pay for a change that he desires. An equivalent variation is the amount of money a person would accept as compensation for a change that he does not desire. See John R. Hicks, *The Four Consumer's Surpluses*, 11 REV. ECON. STUD. 31 (1943). Welfare economists have traditionally assumed that with respect to any particular entitlement the compensating and equivalent variations would be very close to one another. *E.g.*, JOHN R. HICKS, A REVISION OF DEMAND THEORY 65 (1956); Robert D. Willig, *Consumer's Surplus Without Apology*, 66 AM. ECON. REV. 589 (1976).

⁵² For the many problems that attend use of experimental markets, see Charles R. Plott, *Rational Choice in Experimental Markets*, 59 J. BUS. S301 (1986). For example, psychologists, who often produce results quite inconsistent with the Coase theorem, tend to use rich descriptions designed to simulate real world behavior. The experiments by economists tend to be extremely stripped down.

⁵³ Don L. Coursey, John L. Hovis, & William D. Schulze, *The Disparity Between Willingness to Accept and Willingness to Pay Measures of Value*, 102 Q.J. ECON. 679 (1987); see also Coursey, Hoffman & Spitzer, *Fear and Loathing in the Coase Theorem: Experimental Tests Involving Physical Discomfort*, 16 J. LEGAL STUD. 217 (1987).

receive a certain amount of money for being subjected to the fluid, provided that they were the low bidder. The bidding showed consistently that willingness to pay was much lower than willingness to accept. In some tests willingness to pay to avoid the fluid averaged under \$3.00, while willingness to accept the fluid required average payments higher than \$10.00. A dozen other experiments by both economists and psychologists have produced the same results.⁵⁴ The experiments generally conclude that when the valuation process is applied to goods or services that are not ordinarily traded on markets (e.g., clean air, unwaivable landlord's habitability warranties) the disparities between willingness to accept and willingness to pay are much larger than they are for market goods.⁵⁵ In some cases involving environmental entitlements, differences between willingness to pay and willingness to accept ranged from factors of 4 to 16.⁵⁶

The studies also suggest that people tend to regard their current or anticipated income as an important reference point for determining the utility of income. That is, for one who has become accustomed to a given standard of living, the utility cost of a sudden substantial reduction in income is much greater than the utility gain of a sudden increase in income of the same magnitude.⁵⁷

Mark Kelman has argued that observations such as these undermine the Coase Theorem.⁵⁸ I do not believe that is true. The tests

⁵⁴ E.g. R.G. CUMMINGS, D.S. BROOKSHIRE & W.D. SCHULZE, *VALUING ENVIRONMENTAL GOODS: AN ASSESSMENT OF THE CONTINGENT VALUATION METHOD* (1986); David M. Grether & Charles R. Plott, *Economic Theory of Choice and the Preference Reversal Phenomenon*, 69 AM. ECON. REV. 623 (1979); Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 ECONOMETRICA 263 (1979); Jack L. Knetsch & J.A. Sinden, *Willingness to Pay and Compensation Demanded as Experimental Evidence of an Unexpected Disparity in Measures of Value*, 99 Q.J. ECON. 507 (1984).

⁵⁵ E.g., Coursey, Hovis & Schulze, *supra* note 53, at 680.

⁵⁶ E.g., JUDD HAMMACK & GARDNER M. BROWN, *WATERFOWL & WETLANDS: TOWARD BIOECONOMIC ANALYSIS* (1974) (hunters would pay \$247 on average to preserve a wetland hunting area, but would require \$1044 to release an entitlement to it that they already had); Philip A. Meyer, *Publicly Vested Values for Fish and Wildlife: Criteria in Economic Welfare and Interface with the Law*, 55 LAND ECON. 223 (1979) (same); Rowe & Brookshire, *An Experiment in the Economic Value of Visibility*, 8 J. ENV. ECON. & MANAGEMENT 1 (1980) (on air quality, difference between willingness to pay and willingness to accept was as much as factor of 16); William D. Schulze, Ralph C. d'Arge & David S. Brookshire, *Valuing Environmental Commodities: Some Recent Experiments*, 57 LAND ECON. 151 (1981) (same). For earlier experiments along the same lines, see David Bramhall & Edwin S. Mills, *A Note on the Asymmetry Between Fees and Payments*, 2 WATER RESOURCES RES. 615 (1966); M.I. Kamien, N.L. Schwartz & F.T. Dolbear, *Asymmetry Between Bribes and Charges*, 2 WATER RESOURCES RES. 147 (1966); Richard A. Tybout, *Pricing Pollution and Other Negative Externalities*, 3 BELL J. ECON. & MGMT. SCI. 252 (1972).

⁵⁷ Coursey, Hovis & Schulze, *supra* note 53, at 679; Kahneman & Tversky, *supra* note 54; see also Jack L. Knetsch, *The Endowment Effect and Evidence of Non-Reversible Indifference Curves*, 79 AM. ECON. REV. 1277 (1989).

⁵⁸ Kelman, *supra* note 11, at 678-95.

merely illustrate that people acting as consumers bargain their utility, not their dollar profits. For most people, the marginal utility of dollars declines. As a result, from any given starting point, people tend to regard a payment of, say, \$1000 out of their income as "costing" more, in utility terms, than the gain they obtain from a contribution of \$1000 to their income. Furthermore, it appears that the utility curve for income has a discontinuous change in slope, or a "kink," at people's current level of income. That is, people with a weekly income of, say, \$800, tend to regard that \$800 as extremely important to their well-being, and losing \$100 of it would be very serious. Getting an additional \$100 above the \$800 might be nice, but it would not increase satisfaction nearly as much as the loss of \$100 would decrease satisfaction.

The invariance thesis of the Coase theorem assumes that the marginal utility of income is constant. The proposition that the same allocative result obtains regardless of how legal entitlements are initially assigned assumes that the person who is willing to sell an entitlement for \$60 or more is also willing to purchase it for \$60 or less—*i.e.*, its value at the margin is \$60, and the marginal value is all that counts. For the business firm engaged in business relationships this may be so,⁵⁹ disregarding wealth effects, but not necessarily for the individual consumer. This fact has proved quite troublesome for neoclassical welfare economists, who have generally assumed that willingness to pay and willingness to accept are about the same thing.⁶⁰

The person who must purchase an entitlement buys it with income that he already has, while the person who sells an entitlement receives an increment above his current income. People generally maximize their utility, not their wealth. If the marginal utility of income declines, a person willing to pay N dollars for an entitlement that he does not have would require more than N dollars as the price for selling an entitlement that he already has—*i.e.*, since the incremental dollars give him less utility than the dollars he already has, he will require more dollars to yield the same utility.⁶¹

⁵⁹ Although not necessarily. A growth conscious manager might regard an annual report showing a 10 cent per share decline in profits as far more harmful than a report showing a 10 cent increase as beneficial. But this would be an indicator that the manager was maximizing output, not profits.

⁶⁰ *E.g.*, Knetsch & Sinden, *supra* note 54, at 507 ("The usual presumption is that, aside from small differences due to income or wealth effects, estimates of value will be invariant between the two measures.").

⁶¹ Figure One illustrates. The vertical axis measures consumer utility, expressed in utils. The horizontal axis measures wealth, in dollars. Function C shows constant marginal utility of income drawn at three utils per dollar: each additional unit of income produces three additional units of utility. Function D shows declining utility of income, with a kink at point X.

For example, suppose that a person receives ten fewer utils, or units of utility, from each \$1000 added to her income, and that at her current income level the marginal utility generated by \$1000 in income is 100 utils. An increment of \$1000 from this point will give her 90 utils, an increment of \$2000 from this point will give her 170 utils (90 + 80), etc. On the other hand, \$1000 taken away from her income will reduce her utility by 100 units, and \$2000 taken away will reduce it by 210 units (100 + 110).

Now consider a nuisance case, since the Coase theorem was designed around nuisance and trespass cases in bilateral bargaining situations. This particular nuisance case involves a purely aesthetic dispute between two home owners. One home owner wishes to put up a fence that a neighboring homeowner finds quite ugly, and that will reduce her happiness by 100 utils. Using the numbers above, if the offended neighbor must purchase a promise not to build the fence, she will be willing to pay \$1000 out of her existing wealth. But if she owned the right to enjoin construction of the fence, she would demand approximately \$1111 as a payment, for the incremental dollars bring her less utility per dollar than do the dollars she already has. Since cardinal utilities cannot be quantified and compared interpersonally, different people cannot be shown to have the same utility curves. As a result, we cannot know whether the two

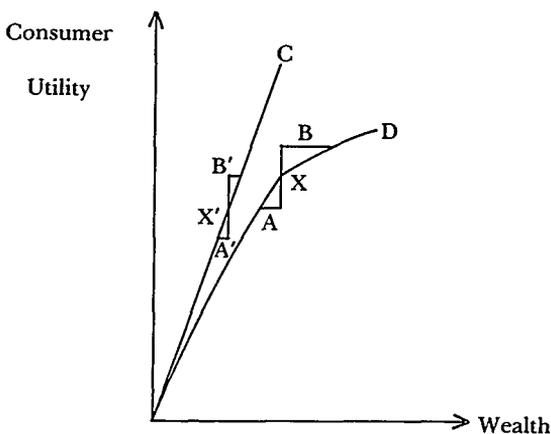


FIGURE ONE

Measurement of compensating and equivalent variations from point X', which is on the constant utility function, shows that the two are equal. Such a person would be willing to pay \$1 (A') for an entitlement that provided 3 units of utility; or, if she already had the entitlement, she would accept \$1 (B') as compensation for giving it up. But if the person had utility curve D, the numbers would be quite different. Someone who did not have an entitlement creating three units of utility would be willing to pay approximately \$2 (A) to have it. But that same person asked to give it up would demand approximately \$5 (B) as compensation.

neighbors' utility curves are identical. In that case the Coase theorem cannot tell us that the initial assignment of the entitlement has no impact on whether the fence will be built. For example, if the offending neighbor experiences constant marginal utility of dollars and the fence gives him utility equivalent to \$1075, he will not build the fence if the entitlement is given to the offended neighbor, but he will build it if it is given to him.

Importantly, the failure of the Coase theorem in the above example is *not* the result of transaction costs, or any other imperfection in the market. The market could be functioning perfectly, yet the Coase theorem fails to show that the initial assignment of legal rights has no bearing on the outcome.

Situations such as the one in the example will occur when both parties to a bargain are acting as consumers, or when one of the parties is a consumer and the other a producer. Consider, for example, the question of the nonwaivable implied warranty of habitability in residential leases in a noncompetitive housing market—one where housing is in short supply in relation to its demand, as it is in many American cities. The Coase theorem suggests that giving landlords as opposed to tenants the duty to maintain housing will have no impact on the quality of the housing—for example, if the furnace does not work it is immaterial whether the landlord or the tenant is given the obligation to fix it. If fixing it costs \$40 and heating is worth only \$30 to the tenant, the furnace will not be fixed. If the tenant must pay to fix it, she will not pay. If the landlord must pay to fix it, he will simply reduce the rent by, say, \$35 in exchange for a waiver from the tenant, and both landlord and tenant will be better off. Because the parties will bargain their way to an efficient solution, an inalienable (*i.e.*, unwaivable) entitlement on the tenant's part to have the furnace repaired by the landlord will be inefficient. It means that the landlord will simply be required to raise the rents by \$40, even though that is not in the best interest of the tenant.

But if the tenant obtains more satisfaction per dollar from the wealth he already has than from any wealth he may additionally acquire, this will not necessarily be the case. Particularly if the tenant is spending close to his income level on things he regards as necessities, the price he would pay for heat that he did not have will be less than the price he would demand for an entitlement to heat that he already has. This suggests that in a market in which landlords are earning an economic surplus, a nonwaivable implied warranty of habitability would (1) increase the quality of housing and (2) the costs would not be passed on entirely to tenants.

The fact that consumers place different values on goods or services depending on whether they are "buying in" or "selling out" is a

natural consequence of the declining marginal utility of income. But this creates a problem for the welfare economist, since marginal utility curves cannot be measured by the external observer. For example, Alice might be unwilling to purchase adequate medical care for her sick child because she does not have the \$1000 a month that it costs. But nevertheless Alice would not sell an entitlement to such care, if she already had it, for \$2000. The entitlement may not be something for which we can observe transactions, if there is no market for such entitlements. They are created by legislation and are not transferable—for example, my 70 year-old father cannot sell me or anyone else his Medicare privileges.

Which of the above two numbers should we use in identifying the efficient solution to the problem of expensive health care, \$1000 or \$2000? The neoclassical preference for markets says that Alice “values” the offered medical care at less than \$1000, for she is unwilling to purchase it at that price. In an efficient market she would not have the care if the care costs \$1000. But if we give her the entitlement to begin with, then it is clear that she “values” the care by far more. She would not sell her entitlement for \$2000.

Suppose the welfare economist wants to know whether Alice’s entitlement to health care is efficient? Is Alice’s “welfare” less than \$1000, or is it greater than \$2000? Clearly, *if the welfare economist has reliable information about both numbers, he must take the larger one into account in calculating welfare.* For example, if Alice currently had the entitlement and it were transferable, we would accept her refusal to sell it for \$2000 as evidence that the entitlement gave her at least \$2000 in welfare. An equilibrium in which Alice had the entitlement would contain more welfare than one in which it was held by someone who was willing to sell it for, say, \$1100, but not less. The problem, of course, is the premise in the italicized statement. By simply looking at real world markets we can verify that Alice will not purchase medical care when it is priced at \$1000. We have no easy means of identifying the price at which Alice would sell such care, if she were already entitled to it. In this case the economic positivist’s methodological insistence on propositions that can be tested creates a strong bias, not merely in favor of markets, but also in favor of the status quo assignment of entitlements.⁶²

B. The Coase Theorem and Utility (Rather than Profit) Maximization

Although business firms presumably maximize wealth, consum-

⁶² See generally Duncan Kennedy, *Cost-Benefit Analysis of Entitlement Problems: A Critique*, 33 STAN. L. REV. 387 (1981).

ing individuals maximize utility. Wealth is probably an important ingredient in the utility of most people, but it is probably not the only ingredient. Further, utility, unlike wealth, is not cardinally comparable from one person to another. When people are acting as consumers, rather than producers, they may prefer things that do not maximize their wealth. Since wealth can be measured objectively, while utility cannot be, some transactions involving consumers can be expected to produce results that are not efficient when objectively measured.

This argument has two sides: (1) the utility maximizing result may not maximize wealth, objectively measured; or, (2) some market encounters may produce the result that maximizes wealth, objectively measured, but this result will not maximize utility.

As an example of the first, assume that Lewd and Prude⁶³ are neighbors on unzoned property. Lewd proposes to tear down his house and build an adult bookstore. The bookstore will make Lewd's property \$100 more valuable and Prude's property, still used as a residence, \$80 less valuable. Suppose that the law entitles Prude to enjoin the construction of the bookstore as a private nuisance. The Coase theorem says that Lewd will pay Prude a sum between \$80 and \$100 and build the bookstore anyway. But in this case Prude's utility function includes more than wealth. Prude is willing to "pay" something to live in a house free of a neighboring use that he regards as offensive. In fact, it would not be unheard of in such situations for people such as Prude to file suit to enjoin the bookstore even though construction of the bookstore made *both* Lewd's and Prude's property objectively more valuable. Such a conclusion does not suggest that Prude is irrational. It suggests simply that Prude as a consumer—a homeowner—wants an environment that maximizes his utility; and his utility is not exactly the same thing as his wealth. Once again, the failure of the Coase theorem to predict the outcome has nothing to do with the presence of high transaction costs; they are not the issue.

In this case it would be wrong to say that the Coase theorem does not "work"—it works fine, provided that we modify its meaning to refer to Prude's utility rather than his wealth. Unfortunately, however, this qualification undermines the predictive power of the theorem, for utility functions cannot be measured. One considering the utility of consumers, rather than the wealth of producers, can no longer look at the dollar amounts of transaction costs, or the relevant profits and losses of the participants to a bargain (as measured by objective market value) in order to determine which legal rule

⁶³ Apologies to Amartya Sen, who used Lewd and Prude for a different purpose. See Amartya Sen, *The Impossibility of a Paretian Liberal*, 78 J. POL. ECON. 152 (1970).

will be more efficient. Nor can one verify or falsify the Coase theorem by "observing" that people do the "efficient" thing. We cannot define the efficient thing in terms of objective criteria, such as profit-maximization. The fact that Prude refuses to sell Lewd the right to build his adult bookstore is the only evidence that we have of Prude's utility. Experimental tests such as those of Hoffman and Spitzer finesse this result by defining utility maximization *ex ante* as the "payoff" from a game with a stranger. It is quite conceivable that a person placed in a room with someone else and instructed in a negotiating game will attempt to maximize the payoff, but that the same person living out other aspects of her life will find plenty of things that compete with wealth in her hierarchy of values.

Ellickson's study of dispute resolution among ranchers in Shasta County, California,⁶⁴ is a good example of the producer-oriented Coase theorem coming up against the utility-maximizing consumer. Shasta County's ranchers are business persons, but they also are neighbors. They live on their ranches. Their businesses and their living community are very much the same thing. Ellickson found that the ranchers in Shasta County paid little attention to the basic legal regime or to changes in rules governing fencing obligations in determining who should be held accountable for trespassing cattle, or what the nature of the accounting should be. Ellickson suggests that the failure of the Coase theorem to account for the outcomes he observed is a result of high transaction costs.⁶⁵ But transaction costs appeared to be no higher in Shasta County than in many other inter-business settings. In fact, the participants may have had a standard of honesty that made strategic maneuvering less likely in Shasta County than in many business situations arising in more urban areas. Furthermore, the parties generally eschewed such expensive transacting devices as lawyers and courts. As Ellickson notes elsewhere, the same ranchers were not reluctant to sue outsiders over such things as traffic accidents or water rights.⁶⁶

The real reason the Shasta County ranchers did not engage in strict bargaining in the shadow of the legal system is that the ranchers were neighbors as much as they were business persons. As a result, profits and "neighborliness" had to be traded against each other. The rancher who immediately filed a damage action when a neighbor's cow trespassed might enlarge his profits, but he would not improve the quality of his life in the community. The Shasta county rancher is both business firm and consumer. Thus the busi-

⁶⁴ Ellickson, *supra* note 12.

⁶⁵ *Id.* at 628, 686.

⁶⁶ Robert C. Ellickson, *A Critique of Economic and Sociological Theories of Social Control*, 16 J. LEGAL STUD. 67, 67-68 (1987).

ness firm's desire to maximize profits was constantly compromised by the consumer's desire to maximize utility. Utility, in this case, was a complex quality in which wealth was only one element.

Under the classical Berle and Means critique,⁶⁷ the modern corporation is inefficient because ownership is separated from control. However, there also are reasons for thinking that firms are inefficient precisely because ownership is *not* separated from control. This occurs when people deal with one another in their same capacity as producers and consumers. Farmers are a good example. As firms, they seek to maximize profits. But as individuals who are both neighbors and dwellers, they seek to maximize the total quality of their living situation, of which wealth is only one important element. For example, my neighbor's extremely smelly hog operation may have no negative impact on my farm's financial operations. But I *live* on my farm too, and as a result it may affect the quality of my life as a consumer. Before the Coase theorem will make reliable predictions in such situations it must disaggregate firm (profit-maximizing) behavior from consumer (utility maximizing) behavior.

A second problem is that the results that the Coase theorem identifies as efficient, because they maximize wealth, do not necessarily maximize utility. This is so because different people place different utility values on dollars, but the Coase theorem considers only transfers of dollars *qua* dollars in its assessment of welfare.

To take another nuisance example, suppose that you and I share an inland lake. I like to fish for pleasure from my rowboat and you like to run your speedboat. Your boating makes my fishing impossible, but it is not tortious and no ordinance prevents your use of a speedboat on this particular lake. Suppose further that I derive 8 utils, or units of utility, from fishing and that you derive 6 utils from boating. However, you are relatively wealthy and as a result have a relatively low marginal utility for dollars. A dollar gives you 2 utils of utility. I am relatively poorer, and a dollar gives me 4 utils of utility. Utils are not exchangeable currency; so if we should bargain about continued operation of your speedboat, I will offer you dollars. In this case you are earning utility, not profit, from operating your speedboat, and you would insist on at least \$3 as compensation for putting it in dry dock for the season. I also am earning utility, not profit, from fishing; and I would be willing to pay you only \$2, for that would cost me 8 utils of utility, the same as I obtain from fishing. In this case you will continue to operate your noisy boat even though continued operation results in only 6, rather than 8 utils of enjoyment between us.

67 See A. BERLE & G. MEANS, *supra* note 39.

The parties will fail to bargain their way to a utility maximizing solution because they are acting in their capacity as utility-maximizing consumers rather than profit (dollar) maximizing producers. But an external observer could not examine the transaction described above and say anything about the utility result, since utilities cannot be cardinalized and compared from one person to another—*i.e.*, there is no such thing as a “util” that represents the same amount of utility to different people. The external observer can see only the dollar effects of the transfer—he can observe, for example, that I offered you \$2 to stop running your speedboat, that you refused, and that I failed to make a higher offer. If the legal liability rule were reversed and I could enjoin your operation of the speedboat, you would pay me \$2.50 or so for the right to continue. Utility would be maximized only in the second case.

But in both cases the external observer would conclude that we have reached the efficient solution—continued operation of the speedboat. The observer would see the Coase theorem functioning perfectly because she equates the wealth maximizing solution with the utility maximizing solution. There is no basis for such a conclusion. A more realistic conclusion is that when people are acting in their capacity as utility-maximizing consumers the Coase theorem says nothing about the welfare consequences of private bargaining.

IV

CONCLUSION: WEALTH DISTRIBUTION AND WELFARE UNDER THE COASE THEOREM

The preceding discussion suggests four corollaries to the Coase theorem for the legal policy maker concerned about distributive justice.

- (1) *If information is perfect and there are no transaction costs, the state's initial assignment of wealth or entitlement to the parties cannot be shown to affect the efficiency of the outcome.*
- (2) *The more efficient the market, the less socially costly it is for the state to assign initial entitlements on the basis of criteria unrelated to efficiency.*
- (3) *If consumers' utility curves are not the same as their wealth curves, then the Coase theorem fails to prove that private bargaining will yield the utility maximizing outcome, insofar as consumers are concerned.*
- (4) *Even in the absence of transaction costs, the amount of social utility can be affected by the initial assignment of an entitlement.*

Critics have often complained that the Coase theorem is nothing more than a normative bias against state interference in the market, disguised as a “theorem.” The traditional, antistatist corollary about entitlements is that they should be assigned to the person

who values them most highly, because that is the way they would be assigned in an efficient market.

A few people have noted, however, that the Coase theorem can be turned into a *defense* of certain kinds of wealth redistribution. Indeed, Corollary One above, which is nothing more than a restatement of the theorem, asserts that if markets are efficient, people will bargain their way to an efficient solution regardless of the initial assignment of entitlements.

Corollary One suggests Corollary Two: if markets are working well, entitlements may be assigned on the basis of fairness or justice, or some similar criteria unrelated to economic efficiency. The allocatively efficient solution will emerge nonetheless.⁶⁸ Perhaps more importantly, there may be alternative mechanisms for estimating individual utility functions—for example, psychological tests suggesting that the poor obtain more utility from a dollar than do the wealthy. If that is so, then the State should not be reluctant to transfer wealth from the rich to the poor in efficiently-working markets. Wealth, measured economically, will be unaffected (ignoring incentive effects), but utility, measured psychologically, might increase.⁶⁹

Likewise, entitlements should be assigned to the person in whom they create the greatest utility, for that is the way they would be assigned in a market in which units of utility could be measured and exchanged. To the extent that interpersonal comparisons of cardinal utilities are impossible, Corollaries Three and Four cannot be stated in such a fashion as to show a specific relationship between the amount of total utility and the initial assignment of a legal right. But Corollary Three is true whether or not one can make interpersonal comparisons of utilities. Further, Corollary Four is verifiable *intrapersonally*, as is shown in the *willingness to pay/willingness to accept* experiments described earlier.⁷⁰ When consumers, rather than producers, are submitted to transactional situations they maximize their utility rather than their wealth. Given that individuals have declining marginal utility of income, they demand more money as compensation for selling an entitlement they already have than they are willing to pay to purchase the same entitlement if they do not have it. As a result, the amount of social utility can be affected by the initial assignment of an entitlement.

The notion of declining marginal utility suggests that the state should feel relatively free to give entitlements to the poor so long as

⁶⁸ Bruce Ackerman, *Foreword: Law in an Activist State*, 92 YALE L.J. 1083 (1983); Gjerdingen, *supra* note 11, at 916-17; Schwab, *supra* note 10, at 1195-96.

⁶⁹ See Herbert Hovenkamp, *Legislation, Well-Being and Public Choice*, 57 U. CHI. L. REV. 63 (1990).

⁷⁰ See *supra* text accompanying notes 51-63.

it can be relatively sure that the poor "value" the entitlements by their cost, with value measured by willingness to accept money for foregoing the entitlement, rather than willingness to pay for the entitlement in the first place.⁷¹ As a matter of welfare economic theory, measures of consumer welfare based on willingness to accept are neither better nor worse than measures based on willingness to pay.⁷²

Further, to the extent we have any information about interpersonal utility measures, it suggests that the relatively poorer members of society derive greater utility from a dollar than do the relatively wealthier. That proposition may be normative, in the sense that it cannot be strictly verified within the confines of subjective value theory, but it is no more normative than the proposition that the rich and the poor derive equal utility from a dollar, which drives much of welfare economics today.⁷³ Further, if one is willing to admit objective criteria of value in addition to information based on subjective preference, the proposition that the poor benefit more from each dollar than the rich is empirically verifiable.⁷⁴

All markets, even simple ones for fungible commodities, are created and defined in the first instance not by nature, but by State policy. Before I can sell you something we must be reasonably sure that the State recognizes my ownership claim, entitles me to sell, and you to buy. In this sense, an entitlement to, say, health care is no more idiosyncratic than an entitlement to a parcel of land. Sovereign policy determines who starts out with what. When economic considerations such as efficiency are used to define the scope of private endowment, these endowments may as easily include the right to health care as the right to land.

⁷¹ On this point, see Richard S. Markovits, *Duncan's Do Nots: Cost-Benefit Analysis and the Determination of Legal Entitlements*, 36 STAN. L. REV. 1169, 1178-79 (1984).

⁷² See, e.g., RICHARD JUST, DARRELL HUETH & ANDREW SCHMITZ, APPLIED WELFARE ECONOMICS AND PUBLIC POLICY 10-11, 84-115 (1982).

⁷³ On the possibility of such comparisons, see AMARTYA SEN, CHOICE, WELFARE AND MEASUREMENT ch. 12 (1982). On the pervasiveness of interpersonal utility comparisons in real world judgments, see Richard S. Markovits, *A Basic Structure for Microeconomic Policy Analysis in our Worse-than-second-best World: A Proposal and Related Critique of the Chicago Approach to the Study of Law and Economics*, 1975 WIS. L. REV. 950, 984-85.

⁷⁴ See Herbert Hovenkamp, *The First Great Law & Economics Movement*, 42 STAN. L. REV. 993 (1990); Hovenkamp, *supra* note 71.