

SYMPOSIUM ON THE COASE THEOREM

LEGAL FICTION: THE PLACE OF THE COASE THEOREM IN LAW AND ECONOMICS

STEVEN G. MEDEMA

University of Colorado at Denver

'You're not making sense, you're just being logical'

Niels Bohr¹

'When I use a word . . . it means just what I choose it to mean neither more nor less'.

Humpty-Dumpty²

1. INTRODUCTION

Modern law and economics received much of its impetus from Ronald Coase's analysis in 'The Problem of Social Cost,' and a goodly amount of that comes from the Coase theorem, which states that, absent transaction costs, externalities will be efficiently resolved through bargaining. The fact that the analysis that came to be codified in the Coase theorem was

The author wishes to thank the editors, an anonymous referee, Warren J. Samuels, James M. Buchanan, Peter Boettke, Karen Vaughn, and participants in the J. M. Kaplan Workshop in Political Economy at George Mason University for their instructive comments on earlier drafts of this essay. The usual caveat applies.

¹ Quoted in Schotter (1996, p. 204).

² Lewis Carroll, *Through the Looking Glass*.

(intentionally) an exercise in pure fiction on Coase's part did not deter the erection of a substantial edifice of positive and normative analysis on this foundation, nor, for that matter, has subsequent elaboration of Coase's intent done anything to abate the interest in the theorem and its implications.³ Indeed, the controversy over the Coase Theorem continues to this day,⁴ although the true message of 'The Problem of Social Cost' is now garnering increasing attention, particularly within the New Institutional Economics.⁵ That an article which avowedly had nothing to do with legal scholarship, written by someone who has repeatedly emphasized his complete lack of interest in lawyers and legal education,⁶ served as a springboard and foundation for the development, in the hands of others, of the economic analysis of law – the most significant movement within law during the last half of this century and one of the more significant developments within economics over this same time period – raises a host of interpretive issues.⁷ Perhaps no economic work written in this century is as illustrative of the central tensions of hermeneutics as 'The Problem of Social Cost'.

In spite of the often heavily ideological overtones of the Coase theorem debate, the theorem is simply a positive proposition, stating that under certain conditions a particular result will follow. Yet, the Coase theorem has been assailed from the left (as conservative dogma) and from the right (as liberal dogma); its moral, philosophical, and political underpinnings have been called into question; its logic, applicability, and empirical content have been both trashed and defended; it

³ See, e.g., Coase (1988, 1992) and Medema (1994a, Chapter 4; 1996).

⁴ For recent surveys, see Medema and Zerbe (1999) and Zelder (1998).

⁵ For illustrations and discussion of various strains of the NIE literature, see, e.g., Eggertsson (1990), Williamson and Masten (1995), Groenewegen (1996), Furubotn and Richter (1998), and Medema (1998b).

⁶ See, for example, Coase (1993, p. 251) and his comments in Kitch (1983, p. 192).

⁷ For a discussion of the transformation of law and economics during the twentieth century and the place of 'The Problem of Social Cost' within this process, see Medema (1998a).

While it has been argued that Coase's retrospectives on his own work are little more than revisionist history, the evidence – seen through the juxtaposition of 'The Problem of Social Cost' with the entire corpus of Coase's writings – clearly suggests otherwise. See Canterbury and Marvasti (1992) and the response by Medema (1994b), as well as Medema (1994a). That much having been said, the emerging importance of the Coase theorem within public economics and law and economics, and the centrality of place given to Coase within the evolution of the economic analysis of law, proceeded apace with hardly a whimper of rebuttal from Coase. While there are a couple of relatively obscure publications circa 1970 in which Coase repeats what he considers to be the message of 'The Problem of Social Cost', it was not until the publication of a collection of his seminal papers in the late 1980s that Coase (1988) finally came out strongly in an attempt to set the record straight. The obvious question that arises is that of why Coase chose to keep silent for nearly three decades, in spite of what one might rightly call the abuse of his ideas – particularly at the hands of his colleagues at Chicago. Medema and Samuels (1997) offer a number of conjectures in this regard.

has been hailed as offering a new way to conceptualize law and legal culture and attacked as anathema to the traditional common law process.⁸ The present essay will attempt to explain how and why the Coase theorem quickly evolved from a debunking fiction to the basis of one of the most successful branches of applied economics in the last part of this century.

2. THE BASICS

A. A Fairy Tale

The Coase theorem has its genesis in Coase's examination of the potential efficacy of markets for the allocation of broadcast frequencies. Here, Coase (1959, pp. 26–7) pointed out that a perfectly functioning market would allocate rights in broadcast frequencies to their highest-valued uses and thereby substantially enhance the efficiency with which frequencies are allocated *vis-à-vis* their allocation by governmental fiat. Allowing that markets never function as well in reality as they do in theory, Coase argued that the question of how best to allocate frequencies is essentially an empirical one, but that that potential efficiency-enhancing nature of market allocation was at least sufficient to demand serious investigation by governmental authorities.

In elaborating the underlying themes of this argument more generally in 'The Problem of Social Cost', Coase noted that, in the context of modern price theory, the genesis of externality-related market failures is the absence of rights over the externality-related activity. To illustrate this, he demonstrated through a series of examples that when rights are assigned over such an activity, market transactions will generate the socially optimal (wealth maximizing) outcome. As Coase put it:

it is necessary to know whether the damaging business is liable or not for damage caused since without the establishment of this initial delimitation of rights there can be no market transactions to transfer and recombine them. But the ultimate result (which maximizes the value of production) is independent of the legal position if the pricing system is assumed to work without cost. (1960, p. 8)

In making this assertion, Coase was targeting not the analysis of legal rules, but the analysis of market failures as seen in Pigou's *Economics of Welfare* (1932) and the Pigovian tradition. The Pigovian approach argued that divergences between private and social costs could only be cured,

⁸ The list of citations here is far too long to mention. See, for example, the citations in Gjerdingen (1986) and Medema and Zerbe (1999), as well as the references given in note 27, below.

and should be cured, through appropriately-specified taxes, subsidies, or regulations.⁹ But Coase showed that, under the standard neoclassical assumptions regarding the operation of markets, the Pigovian remedies considered necessary for the efficient resolution of externality problems are, in fact, unnecessary. A result long taken to be a given was shown to have no inherent justification.

B. The Rest of the Story

Having argued that frictionless markets will efficiently resolve externalities, Coase proceeded to show the essential irrelevance of this result, owing to the pervasiveness of transaction costs.¹⁰ At a minimum, transaction costs will cause the gains from trade to be exhausted before the global optimum is attained; at worst, they will preclude bargaining altogether. But, said Coase, this should not be taken to imply that the just-trumped Pigovian analysis has won the day in the end; rather, it simply points to the importance of the costs associated with the coordination of economic activity, costs that are as omnipresent in governmental coordination – for example, through Pigovian taxes, subsidies, and regulations – as they are within the market. For Coase, the supposed optimality of markets and government as means of coordinating economic activity are equally fictional. We do not know what the optimum is, nor do we know how to get there. The purported demonstrations of social optima achieved through the use of Pigovian instruments are negated by the associated information and bureaucratic costs. Moreover, the failure of the Pigovian approach to recognize the reciprocal nature of externalities can often prevent the attainment of the least-cost resolution of the externality problem. The combined effect of these issues is that the externality ‘remedy’ may be inferior (in an efficiency sense) to the externality itself. The appropriate policy response to market failure, according to Coase, thus ultimately comes down to assessing whether the market failure is more or less severe than the government failure that would attend the attempt to cure it. The answer, he argues, can only be found through case-by-case comparative institutional analysis (Coase, 1960, pp. 43–4).

In a nutshell, ‘The Problem of Social Cost’ showed that the neoclassical approach to the analysis of externalities was fatally flawed. The assumptions under which the analysis proceeded provided no *a priori* rationale for the supposedly necessary Pigovian corrective instru-

⁹ For elaborations of the modern Pigovian tradition, see, e.g., Baumol (1972), the essays in Lin (1976), Cornes and Sandler (1996) and the discussion of externalities in virtually any public economics textbook.

¹⁰ On the definition and implications of transaction costs, see Dahlman (1979), Barzel (1985), and Allen (1991, 1998).

ments. At the same time, the relaxation of the assumptions that are necessary for optimal market solutions also preclude, except by accident, the optimality claims attributed to Pigovian remedies.

C. What is the Coase Theorem?

The Coase theorem has been stated in several different ways, often with slight, but not necessarily unimportant, variations. Two of the classics are George Stigler's (1966, p. 113) statement that 'under perfect competition private and social costs will be equal' – the first naming of the Coase theorem in print – and A. Mitchell Polinsky's (1974, p. 1665) assertion that 'If transaction costs are zero the structure of the law does not matter because efficiency will result in any case'.¹¹ A statement that closely follows the spirit of Coase is: If rights are fully specified and transaction costs are zero, parties will bargain to an efficient and invariant outcome regardless of the initial specification of rights. This statement of the theorem contains two explicit assumptions and two assertions regarding the results.

Let us begin with the results, which can best be understood as two theses regarding the outcomes. The first is the efficiency thesis, which states that the outcome of the bargaining process will be efficient, regardless of who is initially assigned the right. The concept of efficiency underlying the Coase theorem is Paretian – the exhaustion of all potential gains from trade (Buchanan and Stubblebine, 1962; Buchanan, 1986) – and much of the recent analysis by economists attempting to assess the validity of the theorem employs the Paretian notion of efficiency. Coase himself uses the concept of efficiency in multiple ways in his analysis (maximizing the value of production and minimizing costs, in particular), while, within contemporary law and economics, wealth maximization and cost minimization are the most frequently-employed variants of the efficiency concept. The second of the implied results is the invariance thesis: the outcome of the bargaining process – the allocation of rights and resources (although not necessarily the distribution of income) – will be the same, regardless of who is initially assigned the right. That is, while the efficiency thesis contends that the final allocation of resources consequent on any particular assignment of rights will lie on the contract curve, the invariance thesis says that the final allocation will lie *on the same point* on that curve irrespective of who initially holds the rights over the resource in question. There are versions of the Coase theorem extant in the literature that employ both of these theses and the efficiency thesis alone. Indeed, one of the many oddities surrounding the theorem is that there is no singular Coase theorem. Both the form and

¹¹ See Medema and Zerbo (1999) for a litany of Coase theorems.

content given to the theorem and the notion of efficiency employed affect the conclusions regarding the theorem's correctness.

The theorem's results can be illustrated using two simple examples – one from the realm of property law and the other from the realm of contracts. Suppose that the discharge from an upstream polluting factory causes one million dollars in damage to downstream landowners. The polluter can prevent the damage by installing a filtering device at the cost of 600,000 dollars, whereas downstream landowners could eliminate the damage at a cost of 300,000 dollars. Efficiency clearly dictates that the pollution be eliminated, since the damage is greater than the cost of abatement, and that the optimal way of abating the pollution is for the downstream landowners to undertake the abatement.

Suppose that the landowners file suit and that the court subsequently assigns the downstream landowners the right to be free from pollution damage. The polluter can abate the pollution at a cost of 600,000 dollars. However, recognizing that the downstream landowners can abate the pollution at a cost of 300,000 dollars, the polluter will be willing to offer them any amount up to 600,000 dollars to undertake the abatement. The landowners, in turn, will be willing to accept a payment in excess of 300,000 to do so. Thus, in the absence of transaction costs, a mutually-beneficial bargain will be struck that results in the landowners undertaking the abatement.¹² If, on the other hand, the polluter is given the right to pollute, the downstream landowners, faced with a choice between one million dollars in damages and abatement costs of 300,000 dollars, will choose to abate the pollution. Thus, regardless of the initial assignment of rights, the efficient result – abatement undertaken by downstream landowners – will obtain.

Or, suppose that Ronald contracts to sell a home to Richard at a price of \$100,000. Shortly before the transaction is consummated, Guido offers Ronald \$110,000 for the house and Ronald breaches his contract with Richard to sell to Guido. If the law allows for such contractual breaches, Guido, rather than Richard, ends up purchasing the house from Ronald. If the law states that such a breach is not allowable, Ronald must sell to Richard at the contracted price. But Guido will then offer Richard \$110,000 for the house, an offer which Richard would certainly accept, assuming that he paid something approximating the house's value to him when he purchased it from Ronald. Thus, regardless of the law governing breach, Guido ends up owning the house. The outcome is both efficient – the house ends up in its highest-valued use – and invariant under alternative assignments of rights.

What about the assumptions which take us to these results? An

¹² Note that the distribution of gains from this exchange will depend upon the relative bargaining power of the two sides.

implicit (and necessary) assumption in all formulations of the theorem is that rights are alienable. The further (explicit) assumption that these rights must be fully specified is rather non-controversial. In its simplest form, it holds that some party has legal control over the resource in question. If there are no rights established over said resources, or if rights are incompletely defined, bargaining solutions are all but precluded. For example, neither Richard nor Guido would enter into an agreement to pay Ronald \$100,000 or more for the house if there were no pre-existing rights of ownership.

The assumption of zero transaction costs is much more intricate, and it is the (often unrealized) source of most of the contention over the Coase theorem. Many a scholar has claimed to have demonstrated that the theorem is false by invoking what, in the end, is really just a class of transaction costs. The simple notion of transaction costs is those costs associated with the negotiation process. While these costs are certainly significant in many cases, a more expansive definition is given by Douglas Allen (1998, p. 108): 'Transaction costs are the costs of establishing and maintaining property rights' – perhaps the most important of which (from an application perspective) are information costs. The necessity of the strict zero transaction costs assumption becomes clear with only a moment's thought. Sufficiently large transaction costs will preclude bargaining altogether. But even when transaction costs are very low, the marginal benefit of additional negotiation will exceed the marginal cost at some point, with the result that the final allocation of resources will indeed depend on to whom the rights are initially assigned.

As Coase was not elaborating or proving a theorem (Stigler (1966) is due the credit for first stating and naming the theorem in print), it is perhaps not surprising that he was not more specific and detailed about his assumptions or more probing about the details of his results.¹³ Scores of scholars have undertaken this challenge, however, and the literature purporting to prove, disprove, confirm, or refute the theorem is voluminous.¹⁴ This much can be said with certainty: there exists no generalized proof of the Coase theorem. In contrast, there are an enormous number of 'disproofs', many of them highly technical in nature – in stark contrast to Coase's intuitive formulation of these ideas. The literature here is far too vast to survey in any detail in the present essay. Some of the more significant objections to the theorem include the emptiness of the core (Aivizian and Callen, 1981), imperfect/incom-

¹³ Some of this is also the result of Coase's methodological stance, which differs greatly from the methodology of contemporary mainstream economics. See Mäki (1998), Medema (1994a; 1995), and Zerbe and Medema (1998).

¹⁴ See, for example, the surveys by Cooter (1989), Medema and Zerbe (1999), and Zelder (1998).

plete/asymmetric information coupled with the effects of the resulting potential for strategic behavior (Cooter, 1982; Samuelson, 1985; Farrell 1987), nonseparabilities (Marchand and Russell, 1973), nonconvexities (Starrett, 1972), the necessity of rents (Wellisz, 1964), entry and exit effects (Calabresi, 1965; Tybout, 1972; Frech, 1979), and income and wealth effects (Mishan, 1967). A further implicit assumption of the theorem is that agents are utility maximizers. As we shall see in Section 5, however, there is a growing empirical and experimental literature that calls into question the validity of this assumption in the context of the Coase theorem.¹⁵ Apart from this, the adoption of the Paretian notion of efficiency brings into play the shape of the utility functions, which itself can affect the outcome (Hovenkamp, 1990).

Interestingly, most of the challenges to the theorem's correctness can be dismissed under appropriate (some would argue 'correct') conceptualizations of the meaning of fully-specified rights and zero transaction costs. Those challenges based on, for example, entry and even wealth effects can be shown to violate the assumption of fully-specified property rights, while those based on nonseparabilities, nonconvexities, strategic behavior, risk, etc., violate the assumption of zero transaction costs. Other challenges can be refuted for various reasons (Medema and Zerbe, 1999). The validity of certain challenges also depends upon whether one considers the theorem to include both the efficiency and the invariance theses or the efficiency thesis alone. While Coase's original elaboration of these ideas included both theses, a number of subsequent commentators have dropped the invariance thesis on the grounds that it is invalidated by income effects and their implication that there is no unique efficient solution.¹⁶

Without meaning to trivialize the many objections that have been raised against the Coase theorem, I will assume the position, for the sake of argument, that the theorem is correct, full stop – doing so with the understanding that the epigraphs presented at the beginning of the paper are apposite.

D. The Theorem's Implications

The power of the Coase theorem, and the fascination and infurcation with it, stem from its several implications. The first, and most obvious,

¹⁵ Coase never made this assumption and in fact has criticized the rational utility maximization model (Coase, 1984). He does, however, seem to adopt the idea that individuals will attempt to exploit opportunities for gains from trade.

¹⁶ See Polinsky's (1974) statement of the theorem, above, and that of Cooter and Ulen (1988, p. 105). It is worth noting that Coase (1960) used only examples of externalities between *producing* agents, rendering income effects irrelevant, and it has been asserted that the fully-specified rights assumption invalidates even this challenge (Allen, 1991; 1998).

implication of the Coase theorem is that Pigovian remedies are unnecessary for externality correction. A simple assignment of rights to one party or another is sufficient to ensure the attainment of efficiency through market-like processes. To a mindset that prefers so-called market-generated outcomes to so-called government intervention, the theorem offers an emphatic counter to the market-failure-driven interventionism of neoclassical economics. Presumed instances of market failure are revealed to be nothing more than the failure of law to fully specify rights – a failure that, once rectified, allows markets to generate optimal solutions. The fact that this ‘government versus the market’ issue is nonsensical has not diluted the attractiveness of this implication for those who insist upon the primacy of the market. That government is ‘intervening’ both through the assignment of rights at law and through the imposition of Pigovian remedies should be clear, as should the attendant idea that all of this is apart from the fact that the same costlessly available information that allows the Coase theorem to work its magic in a market context would also allow government to efficiently resolve externalities using Pigovian instruments.

A second implication of the Coase theorem is that externalities will be resolved efficiently not only through an assignment of rights, but *regardless of to whom* these rights are initially assigned. This is very discomfiting to traditional legal scholars, to those who adhere to traditional Pigovian externality theory, and to natural rights theorists. To begin with, the theorem brings to the fore the reciprocal nature of externalities: A may be imposing costs on B, but to reduce the harm to B imposes costs on A. The question is who is going to be allowed to visit harm on whom. Pigovian externality theory, and to some extent traditional legal theory, have proceeded in ignorance of this critical point, assuming that one party (e.g., the polluter) is *the* cause of the externality and that the other party is the victim, and prescribing restraints on the activity of the harm-generating agent.¹⁷ By illustrating how both parties would be willing to pay to avoid having harm visited on them, the Coase theorem brings out this reciprocity very nicely. But the nasty little implication of the Coasean perspective is that traditional notions of causation and harm go out the window.¹⁸

¹⁷ Traditional legal theory is much less guilty here, as Coase points out in ‘The Problem of Social Cost’. Looking back on this, Coase (1993, p. 251) notes that one of his goals in discussing court cases in that article was to show that the legal system did a much better job than the economics profession in recognizing this reciprocity.

¹⁸ In applying this notion of causation on the normative front, Landes and Posner (1983, p. 110) bring out this point very nicely in the context of tort law, noting that ‘If the basic purpose of tort law is to promote economic efficiency, a defendant’s conduct will be deemed the cause of an injury when making him liable for the consequences of the injury would promote an efficient allocation of safety and care; and when it would not promote efficiency for the defendant to have behaved differently, then the cause of the accident

The idea that to whom rights are assigned does not matter for efficiency has an additional disquieting implication for law: the notion that courts determine rights and thus outcomes falls by the wayside, at least in part. That is, rights will inevitably end up in the hands of those who value them most highly, although the attendant distribution of income will be affected by the initial assignment of rights – that assignment determining who makes payments to whom within the Coasean bargaining process. One of the many interesting ironies surrounding the Coase theorem is that the critics from the left have not seized upon this insight with at least as much fervor as supporters from the right. The right can argue that the Coase theorem tells us that judicial attempts at social engineering are fruitless, since parties will bargain around that result when it is in their joint interest to do so. Those on the left could well respond that, since the final allocation is not affected in any case, judges should feel free to assign rights in such a way as to satisfy their distributional preferences – for example, by assigning right to ‘victims’ so that bribes flow to ‘victims’ from the ‘harm-causing agent’ rather than the other way around. Perversely, the Coase theorem is everybody’s friend.

3. THE ECONOMIC ANALYSIS OF LAW

A. Unlocking Law

The analysis of externalities has been an important component of economic theory ever since A. C. Pigou made externalities a centerpiece of his *Economics of Welfare* (1932). Yet until the writing of ‘The Problem of Social Cost’, the analysis proceeded largely in ignorance of existing common law means of dealing with externalities and of common law solutions as potential instruments of externality policy. What Coase’s analysis illustrated so clearly is that the common law of property, contract, and tort is actually one large body of externality policy. This has two implications. First, the economists’ focus on statutory remedies – Pigovian taxes, subsidies, and regulations – was exposed as unnecessarily narrow. Second, and perhaps more important, economists became aware of a wealth of externality-related issues within the law to which economic analysis could be fruitfully applied. Because a particular assignment of rights expands the opportunity sets of some agents and restricts those of others, legal decision making can be conceived of as an exercise in allocation, to which one can readily apply the standard micro-theoretic tools to assess the relative efficiency properties of alternative

will be ascribed to “an act of God” or some other force on which liability cannot rest. In this view, the injurer “causes” the injury when he is the cheaper cost avoider; not otherwise’.

structures of rights and to derive the efficient body of rules to govern individual behavior.¹⁹

If there is a distinction to be made between the situations addressed by common law and the traditional economic theory of externalities, it lies in the context of the externality relationships: common law problems have traditionally dealt with relations between small numbers of agents (illustrated, for example, in the legal cases discussed by Coase), whereas the economic theory of externalities has tended to deal (at least implicitly) with large numbers situations, such as pollution. It is here that the Coase theorem finds the foothold within the economic analysis of law that is less available within traditional externality theory. The simple (and somewhat simplistic) notion of transaction costs is that of bargaining or negotiation costs, and it is generally argued that these costs increase quickly as the number of parties to a bargain increases. This is illustrated in the extreme case by the public goods problem.²⁰ Given this, 'everybody knows' that the bargaining solution will not work in the traditional externality situations, such as air pollution, conceived of within economic analysis²¹ – except, perhaps, in the limit, where the number of parties on both sides is so large that the situation approximates that of perfect competition and, as such, brings us within the bounds of the first optimality theorem.²²

For the small-numbers relations regularly contemplated by law, however, the bargaining solution takes on significant import. The simple notion of transaction costs suggests that impediments to bargaining here may well be minimal. Once legal rules are in place – ranchers are required to fence, surface rights owners also have beneath-the-surface rights, etc. – attendant outcomes can be presumed to be efficient. Were the right in question more valuable to someone other than the agent who is assigned it, that individual would have purchased the right through a voluntary transaction. Legal or political pressures to alter the extant structure of rights are thus revealed to many to be nothing more than rent-seeking by those unwilling to pay the price necessary to acquire them.

By implicitly favoring common law remedies, the Coase theorem logic enhances the probability of efficient resource allocation. Pigovian instruments have the effect of creating inalienable rights, whereas common law rights are usually alienable. A Pigovian remedy that deals with an externality problem in other than least-cost fashion is thus

¹⁹ On the somewhat problematic nature of the efficiency criterion and, in particular, its non-uniqueness, see pp. 224–6 below and Medema and Samuels (1998).

²⁰ But see Coase (1974) and the discussion in Section 6, below.

²¹ The definition of 'everybody' here includes Coase, who accepted that the bargaining solution is not likely to apply to, e.g., air pollution. See Coase (1960, p. 18).

²² See Stigler (1966, p. 113) and Arrow (1969).

virtually guaranteed to generate an inefficient allocation, whereas common law rules simply set the stage for the bargaining that will lead to the efficient resolution of the problem.²³

Or so the story goes.

B. Doing What Comes Naturally

The most significant facet of the Coase theorem's legacy has been its role in placing issues of rights determination in the context of a market. A perusal of an issue of the *Journal of Law and Economics*, or of a textbook in law and economics, does not reveal an inordinately large number of invocations of the Coase theorem. What one does observe, however, are an enormous variety of legal-economic arguments couched in the language of the market, and this language, as well as the underlying logic, derive directly from the Coase theorem.

The idea of placing legal rights in a market context strikes many as wholly inappropriate. But is it? One of the seminal insights of John R. Commons (1924) – hardly one who could be classed ideologically with modern-day Chicago – was that the fundamental unit of economic activity is the transaction – the transfer of legal rights of control – rather than the exchange of goods and services. At their core, input and output markets are vehicles for the transfer of legal rights between agents. To say that the market ought not to be the arbiter of rights is thus to say that markets ought not to exist. When the theory of markets or the theory of exchange tells us that, under particular conditions, resources will be allocated efficiently, what is really being said is that the rights over those resources will be allocated efficiently through the exchange process. This is non-controversial. But if these processes allocate rights over standard producer and consumer goods efficiently, why not also rights over, for example, pollution, unobstructed views, contractual promises, or, in the limit, the use of one's body. Unless these classes of rights can be shown to have characteristics that cause them to differ with respect to their consonance with the underpinnings of exchange theory, there is no a priori reason to expect that the transactions contemplated by law (and thus the economic analysis of law) are any different than the standard transactions of the marketplace.

That the Coase theorem is a foundational element of the economic analysis of law is non-controversial. However, it is in its negation, if you will, that the theorem assumes its most significant import. The theorem says that, granting its assumptions, conflicts over resource use will be

²³ See Posner (1992, pp. 251ff.). This, combined with the legal-economic perspective on judicial behavior and the public choice perspective on legislative and bureaucratic behavior underlies the preference, within the economic analysis of law, for common law rather than statutory remedies. See Posner (1992, Chapter 19).

efficiently resolved upon an assignment of rights over the resource in question, and that the ultimate result will be invariant regardless of to whom the rights are assigned. Crassly put, the structure of legal rules does not matter, allocationally; it is only necessary that legal rules in some form exist, and that the associated rights be alienable. A moment's thought reveals that, if this were actually true in reality, the entire economic analysis of law enterprise would never have left the ground. After all, the economic analysis of law takes as its mission the analysis of the efficiency properties of alternative legal rules – historical, actual, and potential. If any legal rule will generate an efficient and invariant allocation of resources, these studies would have all the import of one purporting to show, by reference to extensive empirical analysis, that the sun rises in the morning. Likewise, the advocacy of particular legal rules based upon their efficiency properties would be nonsensical.

Once we allow that transaction costs preclude the attainment of the optimum contemplated by the Coase theorem, we are immediately faced with the fact that the structure of rights does indeed affect the efficiency with which resources are allocated. But we are also faced with the recognition that these costs prevent agents from doing that which they would do in the absence of these costs. Because of this, it has been argued that two normative implications (or extensions) potentially can be drawn from the theorem.

First, law should be structured so as to minimize the impediments to bargaining.²⁴ Doing so allows agents to attain, or come closer to attaining, preferable but otherwise unattainable outcomes. The second implication is more important, as it goes to the heart of the normative economic analysis of law: rights should be assigned so as to achieve the efficient (i.e., wealth-maximizing) outcome. This idea – conventionally known as the 'mimic the market' approach to rights determination (Posner, 1992, p. 15) – is undoubtedly the most controversial aspect of the economic analysis of law within the greater legal community, and it has been both defended and assailed from a variety of directions.²⁵ Its claim to legitimacy, however, is relatively powerful, and it rests on the Coase theorem.

The theorem says that parties will bargain to the efficient outcome, regardless of how rights are initially assigned, if they are not precluded from doing so. The mimic the market approach to legal decision making simply allows parties to reach the allocative arrangement that they would have arrived at by mutual consent if transaction costs did not get in the way. The argument goes something like this: the Coase theorem shows us the allocation that parties would voluntarily agree to; since

²⁴ Cooter and Ulen (1997, p. 89) call this the 'normative Coase theorem'.

²⁵ For a small taste of this debate, see Posner (1983, Chapters 3,4; 1990, pp. 734ff.), the *Symposium on Efficiency as a Legal Concern*, and the *Response to the Efficiency Symposium*.

transaction costs preclude them from reaching this agreement, we should impose this result via judicial decree. Posner illustrates this very nicely in his discussion of judicial gap-filling in contract law:

The task for a court asked to interpret a contract to cover a contingency that the parties did not provide for is to imagine how the parties would have provided for the contingency if they had decided to do so. Often there will be clues in the language of the contract. But often there will not be, and then the court may have to engage in economic thinking – may have to decide what the most efficient way of dealing with the contingency is. For this is the best way of deciding how the parties would have provided for it. Each party, it is true, is interested just in his own profit, and not in the joint profit; but the larger the joint profit is, the bigger the ‘take’ of each party is likely to be. So they have a mutual interest in minimizing the cost of performance, and the court can use this interest to fill out a contract along the lines that the parties would have approved at the time of making the contract. (1992, p. 93)²⁶

From this perspective, the notion that the efficiency criterion is a dangerous foreign matter foisted upon law by right-wing zealots who worship at the altar of the market cannot be sustained.²⁷ Rather, law simply becomes a vehicle that, via judicial decree, allows conflicts to be resolved in the manner that disputants would themselves mutually demonstrate that they prefer.

The fact that mainstream law and economics has concerned itself almost solely with issues of efficiency and virtually not at all with distribution is in part an artifact of this spin put on the Coase theorem.²⁸ An essential difference between the working of the theorem and the mimic the market approach to legal decision making is that the former gives credence to distributional issues (mutual agreement on division of the gains from trade, so that each party is at least no worse off) while the latter generates a settled assignment of rights that creates winners and losers. The theorem and the mimic the market approach lead to the same allocation, but potentially to vastly varying distributive outcomes. The neglect (positive or normative) of distributive issues within mainstream law and economics may be praiseworthy or blameworthy, depending on one’s perspective, but the Coase theorem itself is blameless here. It does not say that judges should mimic its results when transaction costs are

²⁶ For illustrations and discussion of the application of economic reasoning in actual court cases, see Samuels and Mercuro (1984) and White (1987).

²⁷ See, e.g., Samuels (1973) and Kelman (1979) for attempts to link the Coase theorem with right-wing ideology. Samuels has since recanted (Medema and Samuels, 1997).

²⁸ The efficiency focus is also an artifact of the idea that judges are best placed to concern themselves with issues of efficiency and that distributive issues should be left to legislative bodies (e.g., Posner, 1990, p. 359; 1992, Chapter 19).

positive. It does not equate efficiency with justice, *à la* Posner (1983, pp. 48–115). It does not say that efficiency is an important criterion alongside of or in place of justice, nor that distributional considerations are irrelevant or unimportant. That the theorem has been (mis-)used along these lines by scholars in various camps is equally undeniable.

4. FROM HERE TO TAUTOLOGY

Stanley Fischer (1977, p. 322, n5) once said, in another context, that 'transaction costs have a well-deserved bad name as a theoretical device . . . because there is a suspicion that almost anything can be rationalized by invoking suitably-specified transaction costs'. Such is the case with the Coase theorem. The context within which Coase couched his analysis is that of small-numbers cooperative bargaining – basic Edgeworth box analysis in which parties will exhaust all potential gains from trade because it is in their interest to do so. The major difficulty here is that the theorem takes what is essentially a situation of bilateral monopoly – with its attendant indeterminate solution – and places it in a competitive exchange setting, leaving nirvana just a costless step around the corner.

The strategic behavior that is likely to be present in these small-numbers settings is made possible by the existence of transaction costs – especially incomplete/imperfect/asymmetric (i.e., costly) information. Because the ability to engage in strategic behavior is simply a manifestation of transaction costs, it does not constitute a legitimate challenge to the theorem's correctness. It has been argued, however, that such an expansive notion of transaction costs all but renders meaningless the idea of bargaining and moves the Coase theorem in to the realm of tautology.²⁹ Cento Veljanovski perhaps puts the point most forcefully when he offers that

While it is true that strategy implies that individuals have incomplete information, zero transaction costs cannot mean that individuals are omniscient *i.e.* that they not only have costless information about market variables but also about the production and utility functions of all other individuals in the economy. Because if this is the assumption upon which the COASE theorem is based then it has more in common with astrology than market analysis. (1982, pp. 59–60)

Since Coase himself has suggested that analyzing a world of zero transaction costs is akin to 'divining the future by the minute inspection of the entrails of a goose' (1981, p. 187), Veljanovski may not be so far off the mark.

The controversies and misunderstandings regarding the nature and

²⁹ See, for example, Regan (1972, pp. 429–30), Cooter (1989, p. 67), and Veljanovski (1977, p. 535).

definition of transaction costs point to the problems with the 'theoremness' of the Coase theorem. The theorem is a conclusion derived from certain premises; its correctness is a matter of logical validity given those premises. In the hands of some, at least, the role of the assumptions constituting these premises is to rule out of consideration all of those variables that would prevent the derivation of the conclusion as a matter of logic. Allen (1998, p. 106), for example, is very forthright about saying that, 'The guiding principle used here [i.e., in his analysis] in defining transaction costs is "What costs violate the Coase theorem?"' The validity of the theorem is thus a function of the assumptions defining away certain limiting conditions.

The real issue, then, is not the logic of the theorem, but its domain (Stigler, 1989, p. 632). Rather than take this discussion to imply that all of the transaction-cost-related controversy surrounding the theorem is so much wastage, one needs to draw from it the lesson that transaction costs are ubiquitous. The effect of this, in turn, is to render the Coase theorem *per se* completely devoid of real-world applicability. On the other hand, it also points to the importance of transaction costs within real-world bargaining situations and broader market contexts, as well as to the deficiencies of a theoretical framework ill-equipped to account for them. But then, that was Coase's point in the first place.³⁰

Perhaps reflecting the recognition that transaction costs are inevitably positive in reality, the Coase theorem has often been loosened in the profession discourse – being stated along the lines that when transaction costs are minimal, parties will bargain to an efficient result. More extreme is Posner's (1992, p. 51) statement that, 'Even though transaction costs are never zero, the Coase theorem should approximate reality whenever the transaction cost is less than the value of the transaction to the parties'. This line of thinking effectively moves the theorem, considered empirically, into the realm of the tendency statement – a statement that, under certain conditions, such and such behavior and allocative, etc., results can be expected to occur.

The very tenuous, and even incorrect, nature of this argument is readily apparent. First, the value of the transaction to *each* party must exceed the transaction costs faced by *each* party in order for bargaining to

³⁰ One of the problems that has plagued the analysis of transaction-cost-related phenomena is the lack of a generally accepted definition of transaction costs. Definitions range from the more narrow one of direct bargaining costs, to Dahlman's (1979) resources lost due to imperfect information, to Allen's anything that keeps the Coase theorem from holding (implicitly, anything that precludes the perfect operation of markets). While the last of these may appear to some to be hopelessly tautological, each of these definitions has enormous empirical content, the probing of which could greatly expand our understanding of the function of markets and the bargaining process. On the subject of transaction costs and their various influences, see Williamson (1985), Eggertsson (1990), Cheung (1992), Williamson and Masten (1995) and the references cited in note 10, above.

take place. Second, marginal transaction costs will exceed the marginal benefit from the exchange of rights before q^* . As a result, invariance goes out the window. Third, if marginal benefits are falling and marginal transaction costs are increasing for each agent, the bargaining outcome is likely to vary substantially under alternative assignments of rights. Yes, the end result is always efficient in the Paretian sense,³¹ but that is neither here nor there. Under the 'all gains from trade are exhausted' approach to measuring efficiency, any specification of rights will, by definition, be efficient when transaction costs are sufficiently high as to preclude bargaining.

One can see the influence of the tendency statement view of the Coase theorem throughout law and economics. It is most obvious in the affirmation of market transactions and of contractual terms to which agents have bargained.³² But it goes well beyond this. Take, for example, the case of the form of the legal rule to be used in settling a nuisance dispute. Protecting A's rights with a property rule means that B cannot violate A's rights without his consent – for example, by purchasing the right to do so from A in a voluntary transaction. If A's rights are protected by a liability rule, however, B can violate A's rights without A's consent if he is willing to pay the court-mandated level of compensation to A for doing so. Drawing on the Coase theorem, the economic approach to determining the relative efficacy of these rules turns on the level of transaction costs. If transaction costs are thought to be low relative to the gains from trade, property rules are preferable owing to their ability to induce consensual negotiations. If transaction costs are likely to preclude bargaining altogether, or to greatly limit its extent, then liability rules are preferred. B will violate A's right only so long as its marginal benefit from doing so exceeds the marginal cost of compensation. If the compensation level is set appropriately, we will obtain the same outcome as would have occurred if bargaining had been feasible. The preference for property rules when transaction costs are low is an artifact of the difficulty that the courts may have in ascertaining the efficient level of compensation to accompany the liability rule.

While the tautological version of the Coase theorem is relatively harmless – and even very useful – the tendency statement variant is much less innocuous. It is uncontroversial that bargaining is an important part of the legal process, as witnessed by the high rate at which suits are resolved through the negotiation process prior to going to trial. The question, as regards both pre- and post-trial bargaining, is that of the conclusions that can be drawn from it. The only hard-and-fast conclusion that can be drawn is that the resulting positions are *ex ante*

³¹ See Buchanan (1986).

³² See Schlag (1986, pp. 933ff.) for a litany, and, more generally, Posner (1992, especially Chapters 3 and 4).

Pareto superior; whether the outcome is even reasonably close to the wealth-maximizing optimum is at best ambiguous. Once one allows that transaction costs are positive and thereby opens the door to information-problem-induced strategic behavior, all bets are off. Stigler (1989, p. 631) is correct when he asserts that 'when it is to the benefit of people to reach an agreement, they will seek to reach it'. But it is where they end up along the range of possible agreed solutions that concerns us, and it is by no means clear that this position is nirvana $-\varepsilon$.

V. WHEN GLASS SLIPPERS DON'T SEEM TO FIT

The economic analysis of law was founded on the theory of rational choice. The tendency statement view of the Coase theorem and the 'doing what comes naturally' basis for the efficiency criterion both turn on the validity of this depiction of individual behavior. But does this behavioral model accurately describe behavior within the legal arena? The experimental and empirical literature examining the propensity of agents to bargain along the lines suggested by the Coase theorem has generated very mixed returns.³³

Several sets of experiments undertaken by Elizabeth Hoffman and Matthew Spitzer (at times with others)³⁴ show that agents have a very high propensity to bargain to the wealth-maximizing outcome, including in cases in which an externality is introduced into the process. Even in these relatively sterile student experimental environments, however, the wealth maximizing result is achieved 'only' about 93 percent of the time. In more complex experiments involving multiple contractual terms undertaken by Stewart Schwab (1988), the efficiency rate fell dramatically: only about 20 percent of the bargaining outcomes were efficient.

Still other Coasean bargaining experiments, such as those undertaken by Kahneman, Knetsch, and Thaler (1990) suggest that endowment effects may significantly impact the willingness of agents to bargain. The evidence that entitlement reduces one's willingness to bargain (essentially by increasing one's reservation price for selling) has particular import for the economic analysis of law. The fact that parties have litigated over the rights in question has the potential to create a particularly strong degree of attachment on the part of the individual who is assigned the right. Added to this is the likelihood that these rights are relatively unique, coupled with the evidence that uniqueness seems to increase the strength of endowment effects. (If what is being

³³ The claims of some of these studies to 'test' the Coase theorem are without merit. If the theorem's assumptions are satisfied in reality, the conclusions will necessarily follow. For a survey of this literature, see Medema and Zerbe (1999).

³⁴ See Hoffman and Spitzer (1982; 1985; 1986) and Coursey, Hoffman, and Spitzer (1987), as well as Harrison, Hoffman, Rutström, and Spitzer (1987).

contested could easily be obtained from alternative sources, we would probably not have the litigation in the first place.) The upshot of all of this is that the type of bargaining envisioned by the Coase theorem may well be dramatically curtailed, if not precluded virtually altogether. Even for relatively simple items such as pens and binoculars, the Kahneman, Knetsch, and Thaler experiments found substantial under-trading relative to the theorem's predictions. In fact, a recent empirical study of nuisance cases that resulted in an injunction being granted by the courts revealed that no post-litigation bargaining whatsoever had occurred, even though some of the court-imposed results appeared to offer ample scope for mutually-beneficial post-trial bargains to be struck and transaction costs did not necessarily appear to be prohibitive (Farnsworth, 1998).³⁵

While endowment effects perhaps reflect norms of entitlement once rights are assigned, a recent study by Ellickson (1991) suggests that entitlement norms may reach beyond, and in fact supplant, legal rights. Ellickson examined relations between cattle ranchers and neighboring landowners in Shasta County, California – a case study rather closely paralleling Coase's famous illustration in 'The Problem of Social Cost'. Under open-range laws, cattlemen are not usually responsible for accidental trespass damage, whereas they are strictly liable under closed-range laws. Ellickson finds that cattlemen and their neighbors in Shasta County do, in fact, cooperate to resolve their disputes regardless of who is liable, as the Coase theorem suggests. However, the evidence also suggests that it is not Coase-theorem-type mechanisms (bargaining processes) at work here; rather, individuals seem to rely on community norms to determine their behavior. For example, while the theorem predicts that, when fencing is efficient, the cattleman would install a fence if he were liable (closed range) and that the neighboring landowner would do so if he were liable (open range), it is almost always the cattleman who installs the fence because both cattlemen and their neighbors believe that the cattleman is morally obligated to do so since his cattle cause the damage. The parties here do not seem to bargain in the shadow of the law, but beyond it, and community norms have more force than the legal rule in place.

There are a number of other studies extant that provide similar evidence regarding the tenuous nature of the behavioral underpinnings of the Coase theorem. Of course some of these results may go to the behavioral foundations of economics generally, but that is not our present concern. What matters for our purposes is that these results call into serious question the propensity of real-world agents to bargain

³⁵ For a more broad-based discussion of behavioral issues in law and economics, see Jolls, Sunstein, and Thaler (1998).

along the lines predicted by the Coase theorem. To the extent that the normative prescriptions of law and economics rely on the Coase theorem for their justification, the very foundation of key facets of law and economics is called into question. The evidence-to-theory ratio in law and economics remains very low. Nonetheless, a wide range of evidence questioning the empirical validity of the underlying behavioral assumptions of law and economics is beginning to accumulate, and to motivate a push toward a more behaviorally-grounded law and economics – one that combines the tools of economic analysis with a more predictively accurate depiction of the behavior of agents within the legal arena.³⁶

6. USEFUL FICTION

The significance of the Coase theorem ultimately comes down to one's interpretation of the content to be given to the zero transaction costs assumption and, in a sense, it really does not matter whether the theorem is correct or not. The view espoused here is that the theorem is indeed correct, but that, in the end, this is not necessarily all that important. The importance of the Coase theorem lies in the detailed nature of the assumptions regarding transaction costs and property rights that are required to make it correct. The most important legacy of the theorem thus comes through in the work that it has spawned that attempts to get at the nature of transaction costs and the impact of these costs on the operation of the economic system.

The Coase theorem has led to a substantial literature dealing with economic behavior and institutions and, in the process, to a more detailed and useful sense of what is meant by property. The theorem has helped to enhance our understanding of the relationship between property rights and transaction costs and, in doing so, provided useful insights into how changes in constraints give rise to pressures for and against legal change.³⁷ The transaction cost model has also begun to replace (or at least enrich) the market failure model of government intervention. The theorem informs us that costs associated with the transacting process impact the fluidity with which markets function and thus the efficiency of the results that they generate. Market failures owing to monopoly power, externalities, and public goods can be at least partly ascribed to the existence of transaction costs. Public goods represent an interesting example of how the standard market failure model, as illustrated by Paul Samuelson (1954), can be usefully replaced or supplemented by the transaction cost approach. In applying the standard analysis to the case of the lighthouse, Samuelson (1964, p. 45)

³⁶ Again, see Jolls, Sunstein, and Thaler (1998) for a survey of the evidence and a description of the potential form of a more behaviorally-grounded law and economics.

³⁷ On these topics, see, for example, Eggertsson (1990) and North (1981).

makes what can, in the light of Coase's analysis, be interpreted as a transaction-cost-based argument: lighthouses tend to provide benefits in excess of their costs, but there is no way to collect the appropriate tolls from the consumers of these services, thereby necessitating governmental provision. The supposed inability to collect tolls is, at its heart, a transaction cost problem of the most basic variety. Yet Coase (1974) has shown that transaction costs have not always been prohibitive here; the British lighthouse system was once a well-functioning private system, one in which private lighthouse operators were able to devise a profitable means of circumventing the transaction cost problem.³⁸ The rise of the transaction cost approach to many of the problems of economic analysis – much of which work takes place under the banner of the new institutional economics³⁹ – shows that the operationally significant legacy of the Coase theorem lies in its role in calling to the attention of economists the important role played by transaction costs within the economic system. Beyond this, the traditional Pigovian emphasis on regulatory instruments for dealing with externalities has been supplemented by an increased willingness of national and international policy-making bodies to embrace market-oriented solutions to externality problems (such as marketable pollution permits) and by more careful attention to the question of whether certain externality problems are really worth 'fixing'.

That the Coase theorem is an unrealistic description of legal-economic reality should have been evident from the beginning. The intensity of the debate surrounding the theorem is derivative of the interesting theoretical puzzle that it poses, the fascination of economists with determinate, optimal solutions to questions of economic policy (accompanied by the desire of some within the legal community for a more scientific grounding for law), and the normative debate that, either implicitly or explicitly, seems to follow the theorem wherever it goes. Several normative prescriptions have been said to follow from the theorem: (i) market solutions to externality problems are preferable to governmentally-imposed solutions; (ii) legal-economic policy should be designed in such a way as to minimize transaction costs and thereby facilitate private bargaining; (iii) government should not interfere with property and contract – property and contract are efficient, and interference with these will decrease economic welfare; (iv) when transaction costs are prohibitive, rights should be assigned to those who value them most highly, thereby mimicking the result that would obtain if the market could operate fluidly. Of course the Coase theorem says none of this. It is a positive statement with no direct normative

³⁸ For a related discussion of the private provision of water in eighteenth- and nineteenth-century London, see Tynan and Cowen (1998).

³⁹ See, e.g., the references in note 5, above.

implications – an ‘is’ statement, not an ‘ought’ statement – going to the presence or absence of efficiency under particular conditions. It does not tell us that efficiency is all that matters, or even that efficiency matters at all. It is the normative baggage that has been appended to the Coase theorem that appears to have generated most of the hostility to it, and thereby to the economic analysis of law.

Even if one wishes to make efficiency the goal of legal-economic policy, the Coase theorem says nothing about the relative merits of market versus administrative (or Pigovian) remedies, nor does it establish the sanctity of property and contract. By pointing to the importance of transaction costs, the Coase theorem escorts us into the larger issue of the costs associated with the coordination of legal-economic arrangements. If coordination is costless, both markets and government function optimally; if coordination is costly, both markets and government can be expected to function sub-optimally. The rhetorical and mathematical flourishes purporting to demonstrate that perfect markets trump imperfect governments or that omniscient governments dominate imperfect markets get us nowhere. The task for legal-economic policy is, at least in part, to assess the magnitude and influence of these relative coordination costs and the resulting implications for alternative institutional-policy arrangements. But then, that was Coase’s argument from the beginning. Truth may not always be as interesting as fiction, but both have their place; it is simply (and not so simply) a matter of proportion and perspective.

REFERENCES

- Allen, Douglas W. 1991. ‘What are transaction costs?’ *Research in Law and Economics*, 14:1–18
- Allen, Douglas W. 1998. ‘Property Rights, Transaction Costs, and Coase: One More Time’. In *Coasean Economics: Law and Economics and the New Institutional Economics*, pp. 105–18. Steven G. Medema (ed.). Kluwer
- Aivazian, Varouj A. and Jeffrey L. Callen. 1981. ‘The Coase Theorem and the Empty Core’. *Journal of Law and Economics*, 24:175–81
- Arrow, Kenneth J. 1969. ‘The Organization of Market Activity: Issues Pertinent to the Choice of Market versus Nonmarket Allocation’. In *The Analysis and Evaluation of Public Expenditures: The PPB System*. Joint Economic Committee, 91st Congress of the United States, 1st Session. US Government Printing Office
- Barzel, Yoram. 1985. ‘Transaction costs: are they just costs?’ *Journal of Institutional and Theoretical Economics*, 141:4–16
- Baumol, William J. 1972. ‘On taxation and the control of Externalities’. *American Economic Review*, 62:307–22
- Buchanan, James M. 1986. ‘Rights, Efficiency, and Exchange: The Irrelevance of Transactions Cost’. In J. M. Buchanan, *Liberty, Market and the State: Political Economy in the 1980s*. New York University Press
- Buchanan, James M. and W. Craig Stubblebine. 1962. ‘Externality’. *Economica*, 29:371–84
- Calabresi, Guido. 1965. ‘The decision for accidents: an approach to nonfault allocation of costs’. *Harvard Law Review*, 78:713–45

- Canterbery, E. Ray and A. Marvasti. 1992. 'The Coase Theorem as a negative externality'. *Journal of Economic Issues*, 26:1179–89
- Cheung, Steven N. S. 1992. 'On the New Institutional Economics'. In *Contract Economics*. Lars Werin and Hans Wijkander (eds.). Blackwell
- Coase, Ronald H. 1959. 'The Federal Communications Commission'. *Journal of Law and Economics*, 2:1–40
- Coase, Ronald H. 1960. 'The problem of social cost'. *Journal of Law and Economics*, 3:1–44
- Coase, Ronald H. 1974. 'The lighthouse in economics'. *Journal of Law and Economics*, 17:357–76
- Coase, Ronald H. 1981. 'The Coase Theorem and the Empty Core: a comment'. *Journal of Law and Economics*, 24:183–7
- Coase, Ronald H. 1984. 'The New Institutional Economics'. *Journal of Institutional and Theoretical Economics*, 140:229–31
- Coase, Ronald H. 1988. *The Firm, the Market, and the Law*. University of Chicago Press
- Coase, Ronald H. 1992. 'The Institutional Structure of Production'. *American Economic Review*, 82:713–19
- Coase, Ronald H. 1993. 'Law and Economics at Chicago'. *Journal of Law and Economics*, 36:239–54
- Commons, John R. 1924. *Legal Foundations of Capitalism*. Macmillan
- Cooter, Robert D. 1982. 'The cost of Coase'. *Journal of Legal Studies*, 11:1–33
- Cooter, Robert D. 1989. 'The Coase Theorem'. In *The New Palgrave: Allocation, Information, and Markets*, pp. 64–70. John Eatwell, Murray Milgate, and Peter Newman (eds.). W. W. Norton
- Cooter, Robert and Thomas Ulen. 1988. *Law and Economics*. HarperCollins
- Cooter, Robert and Thomas Ulen. 1997. *Law and Economics*. 2nd edn. Addison-Wesley
- Cornes, Richard and Todd Sandler. 1996. *The Theory of Externalities, Public Goods, and Club Goods*, 2nd edn. Cambridge University Press
- Coursey, Don L., Elizabeth Hoffman, and Matthew L. Spitzer. 1987. 'Fear and loathing in the Coase Theorem: experimental tests involving physical discomfort'. *Journal of Legal Studies*, 16:217–48
- Dahlman, Carl J. 1979. 'The problem of externality'. *Journal of Law and Economics*, 22:141–62
- Eggertsson, Thráinn. 1990. *Economic Behavior and Institutions*. Cambridge University Press
- Ellickson, Robert C. 1991. *Order Without Law: How Neighbors Settle Disputes*. Harvard University Press
- Farnsworth, Ward. 1998. 'Do parties to nuisance bargain after judgment? A glimpse inside the cathedral'. *University of Chicago Law Review*, 66:373–436
- Farrell, Joseph. 1987. 'Information and the Coase Theorem'. *Journal of Economic Perspectives*, 1:113–29
- Fischer, Stanley. 1977. 'Long term contracting, sticky prices, and monetary policy'. *Journal of Monetary Economics*, 3:317–23
- Frech, H. E., III. 1979. 'The extended Coase Theorem and long run equilibrium: the nonequivalence of liability rules and property rights'. *Economic Inquiry*, 17:254–68
- Furubotn, Eirik G. and Rudolf Richter. 1998. *Institutions and Economics: The Contribution of the New Institutional Economics*. University of Michigan Press
- Gjerdingen, Donald H. 1986. 'The politics of the Coase Theorem and its relationship to modern legal thought'. *Buffalo Law Review*, 35:871–935
- Groenewegen, John (ed.). 1996. *Transaction Cost Economics and Beyond*. Kluwer
- Harrison, Glenn W., Elizabeth Hoffman, E. E. Rutström, and Matthew L. Spitzer. 1987. 'Coasian solutions to the externality problem in experimental market'. *Economic Journal*, 97:388–402
- Hoffman, Elizabeth and Matthew L. Spitzer. 1982. 'The Coase Theorem: some experimental tests'. *Journal of Law and Economics*, 25:73–98

- Hoffman, Elizabeth and Matthew L. Spitzer. 1985. 'Entitlements, rights, and fairness: an experimental examination of subjects' concepts of distributive justice'. *Journal of Legal Studies*, 14:259–97
- Hoffman, Elizabeth and Matthew L. Spitzer. 1986. 'Experimental tests of the Coase Theorem with large bargaining groups'. *Journal of Legal Studies*, 15:149–71
- Hovenkamp, Herbert J. 1990. 'Marginal utility and the Coase Theorem'. *Cornell Law Review*, 75:783–810
- Jolls, Christine, Cass R. Sunstein, and Richard Thaler. 1998. 'A behavioral approach to Law and Economics'. *Stanford Law Review*, 50:1471–550
- Kahneman, Daniel, Jack L. Knetsch, and Richard H. Thaler. 1990. 'Experimental tests of the Endowment Effect and the Coase Theorem'. *Journal of Political Economy*, 98:1325–48
- Kelman, Mark. 1979. 'Consumption Theory, Production Theory, and ideology in the Coase Theorem'. *Southern California Law Review*, 52:669–98
- Kitch, Edmund W. (ed.). 1983. 'The Fire of Truth: a remembrance of Law and Economics at Chicago, 1932–1970'. *Journal of Law and Economics*, 26:163–233
- Landes, William M. and Richard A. Posner. 1983. 'Causation in tort law: an economic approach'. *Journal of Legal Studies*, 12:109–34
- Lin, Steven A. Y. (ed.). 1976. *Theory and Measurement of Economic Externalities*. Academic Press
- Mäki, Uskali. 1998. 'Is Coase a realist?' *Philosophy of the Social Sciences*, 28:5–31
- Marchand, James R. and Keith P. Russell. 1973. 'Externalities, liability, separability, and resource allocation'. *American Economic Review*, 63:611–20
- Medema, Steven G. 1994a. *Ronald H. Coase*. Macmillan
- Medema, Steven G. 1994b. 'The myth of two Coases: what Coase is really saying'. *Journal of Economic Issues*, 28:208–17
- Medema, Steven G. 1995. 'Ronald Coase on economics and economics method'. *History of Economics Review*, 24:1–22
- Medema, Steven G. 1996. 'Of Pangloss, Pigouvians and pragmatism: Ronald Coase and social cost analysis'. *Journal of the History of Economic Thought*, 18:96–114
- Medema, Steven G. 1998a. 'Wandering the Road From Pluralism to Posner: The Transformation of Law and Economics in the Twentieth Century'. In *The Transformation of American Economics: From Interwar Pluralism to Postwar Neoclassicism: History of Political Economy* 30, (supplement): 202–24
- Medema, Steven G. (ed.). 1998b. *Coasean Economics: Law and Economics and the New Institutional Economics*. Kluwer
- Medema, Steven G. and Warren J. Samuels. 1997. 'Ronald Coase and Coasean Economics: Some Questions, Conjectures and Implications'. In Warren J. Samuels, Steven G. Medema, and A. Allan Schmid, *The Economy as a Process of Valuation*, pp. 72–128. Edward Elgar Publishing
- Medema, Steven G. and Richard O. Zerbe, Jr. 1999. 'The Coase Theorem'. In *The Encyclopedia of Law and Economics*. Boudewijn Bouckaert and Gerrit De Geest (eds.). Edward Elgar Publishing
- Mishan, Ezra J. 1967. 'Pareto Optimality and the law'. *Oxford Economic Papers*, 19:255–87
- North, Douglass C. 1981. *Structure and Change in Economic History*. W. W. Norton
- Pigou, A. C. 1932. *The Economics of Welfare*. 3rd edn. Macmillan
- Polinsky, A. Mitchell. 1974. 'Economic analysis as a potentially defective product: a buyer's guide to Posner's *Economic Analysis of Law*'. *Harvard Law Review*, 87:1655–81
- Posner, Richard A. 1983. *The Economics of Justice*. Harvard University Press
- Posner, Richard A. 1990. *The Problems of Jurisprudence*. Harvard University Press
- Posner, Richard A. 1992. *Economic Analysis of Law*. 4th edn. Little, Brown and Company
- Regan, Donald H. 1972. 'The problem of social cost revisited'. *Journal of Law and Economics*, 14:427–37

- Samuels, Warren J. 1973. 'The Coase Theorem and the study of Law and Economics'. *Natural Resources Journal*, 14:1–33
- Samuels, Warren J. and Steven G. Medema. 1998. 'Ronald Coase on Economic Policy Analysis: Framework and Implications'. In *Coasean Economics: Law and Economics and the New Institutional Economics*, pp. 65–94. Steven G. Medema (ed.). Kluwer
- Samuels, Warren J. and Nicholas Mercuro. 1984. 'Posnerian Law and Economics on the Bench'. *International Review of Law and Economics*, 4:107–30
- Samuelson, Paul A. 1954. 'The Pure Theory of Public Expenditure'. *Review of Economics and Statistics*, 36:386–9
- Samuelson, Paul A. 1964. *Economics: An Introductory Analysis*. 6th edn. McGraw-Hill
- Samuelson, William. 1985. 'A Comment on the Coase Theorem'. In *Game-Theoretic Models of Bargaining*, pp. 321–39. Alvin E. Roth (ed.). Cambridge University Press
- Schlag, Pierre. 1986. 'An appreciative comment on Coase's "The Problem of Social Cost": a view from the Left'. *Wisconsin Law Review*, 1986: 919–62
- Schotter, Andrew. 1996. "'You're Not Making Sense, You're Just Being Logical'". In *Foundations of Research in Economics: How Do Economists Do Economics?* pp. 204–15. Steven G. Medema and Warren J. Samuels (eds.). Edward Elgar
- Schwab, Stewart J. 1988. 'A Coasean experiment on contract presumptions'. *Journal of Legal Studies*, 17:237–68
- Starrett, David A. 1972. 'Fundamental nonconvexities in the Theory of Externalities'. *Journal of Economic Theory*, 4:180–99
- Stigler, George J. 1966. *The Theory of Price*. 3rd edn. Macmillan
- Stigler, George J. 1989. 'Two notes on the Coase Theorem'. *Yale Law Journal*, 99:631–33
- Tybout, Richard A. 1972. 'Pricing pollution and other negative externalities'. *Bell Journal of Economics*, 3:252–66
- Tynan, Nicola and Tyler Cowen. 1998. 'The private provision of water in eighteenth- and nineteenth-century London'. Mimeo. George Mason University Department of Economics
- Veljanovski, Cento G. 1977. 'The Coase Theorem – The Says Law of Welfare Economics?'. *Economic Record*, 53:535–41
- Veljanovski, Cento G. 1982. 'The Coase Theorems and the Economic Theory of Markets and Law'. *Kyklos*, 35:53–74
- Wellisz, Stanislaw. 1964. 'On external diseconomies and the government-assisted invisible hand'. *Economica*, 31:345–62
- White, Barbara. 1987. 'Coase and the courts: economics for the common man'. *Iowa Law Review*, 72:577–635
- Williamson, Oliver E. 1985. *The Economic Institutions of Capitalism*. Free Press
- Williamson, Oliver E. and Scott E. Masten (eds.). 1995. *Transaction Cost Economics*. Edward Elgar
- Zelder, Martin. 1998. 'The Cost of Accosting Coase: A Reconciliatory Survey of Proofs and Disproofs of the Coase Theorem'. In *Coasean Economics: Law and Economics and the New Institutional Economics*, pp. 65–95. Steven G. Medema (ed.). Kluwer
- Zerbe, Richard O., Jr. and Steven G. Medema. 1998. 'Ronald Coase, the British Tradition, and the Future of Economic Method'. In *Coasean Economics: Law and Economics and the New Institutional Economics*, pp. 209–38. Steven G. Medema (ed.). Kluwer