

The Problems of the Coase Theorem

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December 2011
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Abstract:

Since its publication in 1960, Ronald Coase's article "The Problem of Social Cost" has had a tremendous influence in numerous areas of economics. The "Coase theorem" is taught in most environmental economics textbooks and is often applied in field of law and economics, despite a bewildering lack of agreement on what the theorem actually says. This paper critiques the "The Problem of Social Cost" as well as later interpretations of the Coase theorem. It is argued that the Coase theorem is internally flawed and not applicable to the real world.

Introduction

The theorem's allure—and I mean both through repulsion and attraction—has been as powerful as that of any other idea promulgated in the economics arena over the past fifty years.

-Steven G. Medema

Ronald Coase's paper "The Problem of Social Cost" was published in the *Journal of Law and Economics* in October of 1960, an article which would have an "enormous transformative effect on economics and on law—one that was to become one of the most cited articles in both literatures" (Medema 2011, p. 2). "The Problem of Social Cost," along with Coase's 1937 article "The Nature of the Firm," was cited in the decision to award Coase the 1991 Bank of Sweden Prize in Economic Sciences.

Since its publication, "The Problem of Social Cost," has had significant influence in three different economic fields. The Coase theorem has been extensively applied in law and economics which applies neoclassical economic theory to the legal system. It is found in nearly every environmental economics textbooks as a contrast to the Pigouvian approach to externalities. Coase's work has also spawned the development of new institutional economics (as opposed to the original institutionalism of Veblen, Commons, Galbraith, etc.). Members of this school include 2009 Bank of Sweden Prize winners Elinor Ostrom and Oliver Williamson and 1993 winner Douglass North.

In his 1960 article, Coase did not actually refer to a specific "Coase theorem." In the paper Coase argued that under certain conditions bargaining between individuals would deal with an externality in a way that maximized the value of production, regardless of which party was assigned liability for the externality. The theorem itself was summed up and named by George Stigler,

Coase's colleague at the University of Chicago, who stated that, "under perfect competition private and social costs will be equal" (Coase 1998, p. 158). Coase originally argued in terms of the value of production being maximized rather than in terms of private and social costs, but according to Coase "[t]here is, however, no inconsistency. Social cost represents the greatest value that factors of production would yield in an alternative use" (Ibid).

This paper will begin by critiquing Coase's reasoning in "The Problem of Social Cost" and subsequent work. It will be argued that perfect information cannot ensure the desired outcomes and that the theorem cannot work when property rights are defined and enforceable. Furthermore, Coase's argument implicitly relies on economic rents, which means that the assignment of liability can affect the value production and the distribution of income. The paper will then look at the issue of transaction costs and other barriers to real world applications of the Coase theorem. Given that the theory does not hold up internally nor is it applicable to the real world, this paper asserts that we should abandon the Coase theorem altogether.

Rents

Possibly the most discussed example in "The Problem of Social Cost" is about a cattle-raiser whose herd strays onto the land of next-door farmer and causes damage to farmer's crops. Coase lays out different scenarios concerning the value of production but argues that the allocation of resources will be the same regardless of the whether liability is imposed on the rancher or the farmer, as long as the two parties are able to bargain without cost. It should be noted that if the value of production for both parties is equal then the legal structure will determine the outcome as there will be no incentive to bargain (Halpin 2007).

When the rancher is liable for damages, if the cost of the crop damage is greater than the profit attained by the farmer for his produce, the rancher will pay the farmer some amount between the two sums to cease cultivation. Yet, if the rancher can become better off by paying the farmer to abandon cultivation, this means that ranching is a more valuable use of the land. Coase assumes the conditions of perfect competition hold which is a problem because, as Liebhafsky (1973) points out, that Coase's farmer cannot actually be profit-maximizing. He should be using the land for ranching, which is the more profitable activity. This would be the case unless there are economic rents associated with the rancher's land.

In perfect competition all firms receive zero economic profits in long-run equilibrium; that is, a 'normal' rate of profit they could earn in any other industry. We can use as an example Coase's case where one party causes pollution that afflicts a second party. If the polluter were made to pay some additional cost in terms of a payment to the other party, this would cause them to earn less than normal profits, and they would be better off moving to their next best alternative. Likewise, if there was no liability for pollution, the party affected by the pollution would be better off by switching to an alternative employment. In this case, no negotiations or payments between parties would take place as, depending on liability, one of the parties would change their line of work to avoid the externality or to avoid creating it. This would eliminate the externality, which is Coase's focus in the first place. This suggests that the externalities Coase describes are only possible when at least one of the parties is earning economic rents. Coase (1988) refutes this critique with the claim that:

Since in these conditions no one's income could be increased by possession of the right to pollute, no one would pay anything for it. The price would therefore be zero. How can one say that someone does not have the right to pollute when for a zero

price he can acquire it? How can one say that someone must suffer damage when for a zero price he can avoid it? (p. 164)

This logic is less than convincing. While neither party could increase their income by purchasing the right to pollute or to avoid pollution, if one party possessed the right to pollute, giving it up *would* impose a cost on them. The demand price is zero, but the selling price is positive. Liability in this case would determine which party shifts to an alternative economic activity.

Despite his insistence that the argument applies whether or not rents are present, Coase maintains that, “there is no difficulty in rephrasing the argument in terms of rent. It does little more than restate in other words my original argument” (p. 163).” Rephrasing his arguments in terms of rents, Coase asserts that:

Since the rents represent the increase in the value of production (and therefore of incomes) from undertaking a particular activity rather than the best alternative, it follows that the value of production, as measured on the market, is maximized when rents are maximized. (p. 165)

This, however, is a misunderstanding of rents. Rents are a “greater than normal profit earned by a firm which owns an input (land) whose supply cannot be increased in response to price changes...a functionless surplus enjoyed by the owner of a scarce resource” (Liebhafsky, p. 641). Maximizing rents is not necessary to ensure that utilization of a resource will take place. If positive economic rents exist, the activity already rewards more than the next best alternative which returns zero economic profits, so the firm will utilize the resource. Any further increase in the value of rents will not cause an increase in production, so maximizing the value or production is *not* equivalent to maximizing rents.

Liability

Given the existence of rents, Liebhafsky shows how a third possible (and plausible) legal arrangement could not only produce a different outcome, but a higher social benefit. Liebhafsky goes through a detailed analysis using Coase's original example of the farmer and rancher. The following example is based on Liebhafsky's argument but is laid out using Coase's later restatement in terms of rents.

Coase (1988) sets up a case where the rancher's rents are \$100, the value of the crop damage is \$50 and farmer's rents are \$25. We'll add the additional assumption that \$50 is the total value of crop, though this doesn't have to be the case. The value of the farmer's next best alternative would then be worth \$25. Without any liability the damages to the farmer's crop are greater than his rents, and so the farmer doesn't produce any crops and chooses the next best alternative. The value of production is \$100 from ranching plus \$25 for the alternative occupation of the farmer, a total of \$125. If liability is imposed on the rancher, he would end up paying the farmer an amount less than the damages (\$50) but more than the farmer's rent (\$25) to compel him not to cultivate the field. In this case the social benefit remains unchanged as production remains \$100 worth of cattle and \$25 for farmer's next best alternative. The incomes are affected as between \$25 and \$50 of rent is shifted from the rancher to the farmer. Suppose that the one-time cost of building a fence to keep the cows contained is \$65 (for our purposes it could be any amount greater than damages but less than the rancher's rents). Since \$65 is greater than the amount of damages, neither party would willingly build the fence.

However, rather than require the rancher to compensate the farmer for damages, a court could simply require the rancher to build a fence to restrain his cows. This possibility is not completely foreign to Coase. He discusses it in the case of doctor and confectioner, yet he argues that a bargain between them would result in a better outcome for both parties. While this is true, what would be the social benefit if an injunction forced the rancher to build a fence? The rancher would now only earn \$35 in rents (\$100 minus \$65 for the fence), but as he is still earning positive economic rents he would still choose to produce. The lump-sum cost of building the fence would have no effect on the rancher's marginal cost and so he would still produce at the same level of output. With the protection of the fence the farmer would grow his crops. From his perspective the fence results in more income than his next alternative, though less than if he was paid by the rancher for damages. While this situation is not preferred by either party it actually results in a higher level of total production. The value of ranching (\$100) and farming (\$50) in terms of production is \$150, while in the other two cases it was only \$125 (\$100 for ranching plus \$25 for the alternative activity). This result is significant because it shows that within Coase's framework the legal structure can influence the value of production.

Distribution

The example above suggests that under certain conditions the assignment of liability can change both what gets produced and the total value of production; but will the distribution of income be affected by liability? Coase doesn't directly address distribution in his original article "The Problem of Social Cost." From the examples given one would likely infer that liability does affect the income distribution. In one scenario the rancher pays the farmer, in another the reverse.

This seems to apply to all of the examples. However, in “Notes on the Problems of Social Cost” (Coase 1988), we learn that appearances are deceiving. Coase contends that “a change in the liability rule will not lead to any alteration in the distribution of wealth” (p. 171). He argues (assuming that rents only apply to the land and that both parties are leasing the property) that any payment due to the assignment of liability will be factored into the price for leasing the land. The owner of the land would also know about the liability structure and, “the amount that will have been paid to acquire the land will reflect this” (p. 172).

While this imposes more assumptions (including a change from the original supposition that both were land-owners) and more complexity, it doesn’t actually eliminate the problem. Coase has to assume that a land-owner knows how the land will be used in the future and what externalities will be produced before they have occurred and will incorporate this knowledge into the price. Given this condition the change in income doesn’t apply to the rancher or the land owner but would have just been pushed two degrees farther along. Logically it would still have to apply to someone backwards along the chain of sale. Conveniently, Coase’s (1960) own discussion provides us with a counterexample in his description of *Sturges v. Bridgman*. The case involves a doctor who finds he cannot consult patients due to the noise of the next-door confectioner. The doctor and confectioner worked side by side for eight years without incidence until the doctor built a new consulting room and discovered that the noise from the confectioner was now a problem. Clearly the externality was not anticipated and as a result the incomes of the two parties would vary with the decision on liability.

A Question of Information

Accepting the assumptions of perfect competition and no transaction costs, Hahnel and Sheeran (2009) argue that:

. . . voluntary agreements are likely to be *inefficient* even when there is only a single pollution victim, even when property rights are clear, even when transaction costs are zero, and even when negotiators behave rationally. Voluntary agreements will be inefficient, because of perverse incentives to dissimulate that neither Coase, nor his supporters and his critics have ever acknowledged. (p. 216)

To reach this conclusion, they draw the distinction between perfect information and complete information. With complete information each party knows not only their own but also the other party's payoffs for all possible outcomes. Perfect information only entails that, "each party knows 'perfectly' what its own preferences or technologies are" (Ibid, p. 225), along with a vector of market prices. Without the assumption of complete information one party may be able to deceive the other about their true profits or damages. An information advantage for one party can significantly alter the outcome of the negotiation and as a result:

The consequences of dropping the implausible assumption of complete knowledge, or omniscience, are profound ...it seems highly unlikely that Coasian negotiations will lead us to efficient outcomes very often in the real world – even if negotiators behave rationally, even if they believe their negotiations will remain secret forever, even if there are no transaction costs, and even if there is only a single pollution victim. (Ibid, pp. 227-228)

Even if we were to assume that complete information existed, game theory still requires that the following conditions hold in order to arrive at the efficient outcome:

(1) both parties care only about their own payoff, (2) both parties behave rationally, (3) neither party suspects the other may not behave rationally, and (4)

neither player believes the outcome of an early game will become known to players in future games in which the player expects to participate. (Ibid, p. 224)

The problems are magnified when there are multiple parties involved. With multiple victims each has an incentive to deny any damage in hopes that others will pay for abatement or in the opposite scenario to claim damage that has not occurred. These are the well known hold-out and free rider problems, which are in addition to any possible transaction costs that could figure in to negotiations between a greater number of parties. This argument suggests that even the restrictive assumptions of perfect competition are not enough for the Coase theorem to function as stated.

Stating the Theorem

One of the problems with understanding the “Coase theorem” is that there is no definitive statement of it. Butler and Garnett (2003) surveyed 45 microeconomic textbooks and concluded that 80 percent did not accurately represent Coase’s argument. Medema (2011) lays out over a dozen different versions of the theorem with significant variation among them. The many varieties of the Coase theorem highlight how seemingly minor differences in wording have profound effects for the implied applicability. Comparing two examples:

In sum, the Coase theorem states the following: if the property rights to any resource are assigned rather than unassigned, and if exchange costs are sufficiently low, the ultimate use of the resource is independent of the initial assignment of the rights to the resource. (Baird 1975, p. 222, as cited in Medema 2011, pp. 4-5)

As opposed to:

. . . in order to reach the Coase Theorem specified in terms of allocative neutrality of the assignment of rights, advocates must assume zero transaction costs. (Samuels et al 1997, p. 96)

The first example implies that the theorem may function in real circumstances, as long as transactions costs are “sufficiently low.” The second points out the reliance on the *assumption* of zero transactions costs, drawing attention to the theoretical aspect of the theorem.

As in the first example, some versions of the Coase theorem stress the importance of clearly defined property rights; however, this seems to be a misreading of Coase. Coase (1988) argues that “the allocation of resources remains the same whatever the legal position regarding liability for harmful effects” (p. 170). The rule of liability is the important piece of information that allows the parties to bargain, not the clarity of property rights. Looking at Coase’s examples, many of them are situations where property rights are not clearly defined and enforced. Externalities and the need for the assignment of liability arise *because* of ambiguous property rights. If the doctor owned the right to whatever sound could be heard on his property, or if homeowners owned the right to clean air above their property then there would be no need to assign liability.

Coase’s original specification may strike the reader as a rather counterintuitive interpretation of how we usually think of property rights. Coase (1960) points out that:

. . . it is true that there would be no crop damage without the cattle. It is equally true that there would be no crop damage without the crops. . . If we are to discuss the problem in terms of causation, both parties cause the damage. (p. 13)

While it is true, by definition, that there could be no crop damage without crops, it is odd to conclude that based on this principle the farmer causes the damage (at least in part). As Bromley (1978) puts it “we have the curious circumstance that the corn farmer must pay the rancher not to add steers which will graze the farmer's land; if expressed in terms of me paying someone not to

drive his car across my yard, the novelty of it is more obvious" (p. 51). A similar case was made in the television show *The Simpson's*:

Bart Simpson: All right. But on my way, I'm going to be doing this . . .

[*windmills his arms*]

Bart Simpson: If you get hit, it's your own fault.

Lisa: Okay, then I'm going to start kicking air, like this . . .

[*kicks up her foot*]

Lisa: And if any part of you should fill that air . . .

[*kicks up her other foot*]

Lisa: It's *your* own fault.

And later:

Homer: All right, pie. I'm going to start doing this . . .

[*makes chomping motion*]

Homer: -and if you get eaten, it's your own fault.

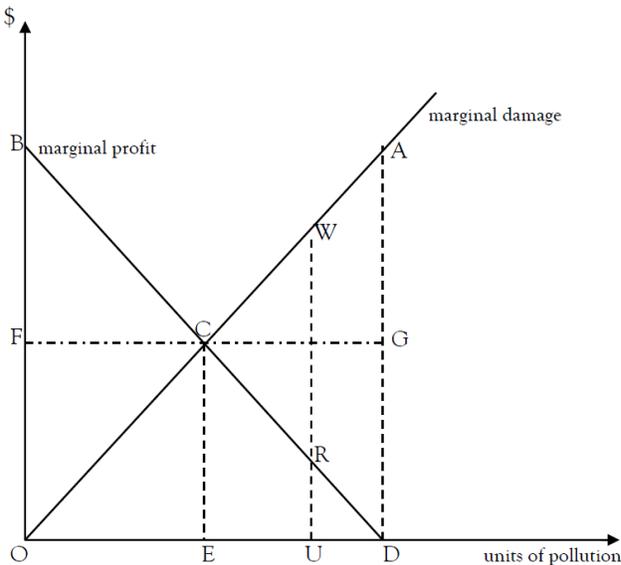
(Scully, 1994)

If we accept the idea of blaming the victim then logically we would have to pay robbers not to take our property and murderers not to take our life. Of course then everyone could be a potential robber or murderer and demand payments not to commit these crimes. So while the principle of shared responsibility *may* apply to situations where property rights are truly hard to define, such as whether one party has the right to a scenic view of property they do not own, it leads to absurd conclusions when property rights are defined and enforceable. Coase (1988) later recognizes that private property rights can be left out completely with no effect on the theorem. The truth is not that property rights *can* be left out of the argument, but that they *have* to be. The Coase theorem is simply not relevant if property rights can be defined and enforced.

Markets and Negotiations

Another problem with the statement of the Coase theorem is that it is often presented like a market transaction. Environmental economics textbook typically compare Coase to the Pigouvian view using graphs such as *Figure 1*. Perfect competition is based on many buyers and sellers. The price is set by the market and taken by participants. The assumption of perfect competition can apply to the price the farmer receives when selling his crop in the market, but market forces do not apply to the negotiations between the two parties.

Figure 1. Standard Presentation of the Coase Theorem



Source: Hahnel and Sheeran 2009

Given that the outcome is based on negotiations there is no reason to assume that the payments will work out to the “efficient point” (point C) because in non-market situations there are no necessary forces that would result in the optimal level of pollution. While the production decisions won’t change, the amount of payment between parties will be indeterminate, even in Coase’s description. If the rancher would gain \$3 by convincing the farmer to abandon cultivation, and the

farmer's net gain from cultivation is \$2, "The farmer would be agreeable to not cultivating the land for any payment greater than \$2. There is clearly room for a mutually satisfactory bargain which would lead to the abandonment of cultivation" (Coase 1960, p. 4). The payment in this case could be anywhere between \$2 and \$3, but the process of negotiation would determine where.

Hahnel and Sheeran (2009) conclude that the Coase theorem has to be modeled using game theory, such as a game of "divide the pie." In addition to the issue of perfect information vs. complete information, the outcome of the negotiations in theoretic games can vary significantly with how the negotiations are set up, such as whether they are repeated or one-off and how offers are made. Experiments that test the predictions of game theory often find decisions that are "inconsistent with what theoretical models assuming mutually rational behavior predict" (Hahnel and Sheeran 2009, p. 224).

Transaction costs

Up until this point we have accepted the assumption of no transaction costs. It is important to address the theorem's validity under this condition because textbooks and papers still stress this condition. Yet, Coase's intent was to draw economics away from such unrealistic assumptions:

The world of zero transaction costs has often been described as a Coasian world. Nothing could be further from the truth. It is the world of modern economic theory, one which I was hoping to persuade economists to leave. (Coase 1988, p. 174)

Coase never intended to argue that zero transaction costs are a realistic assumption. For Coase, "The Problem of Social Cost" was a refutation of the widely used Pigovian argument, which contends that government subsidies or taxes are necessary to deal with externalities. As "standard

economics theory assumes transactions costs to be zero, the Coase Theorem demonstrates that the Pigovian solutions are unnecessary in these circumstances” (Coase 1994, p. 11).

Coase (1960) defines transaction costs as those necessary to “discover who it is one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection need to make sure that the terms of the contract are being observed, and so on” (p. 15). In “The Problem of Social Cost,” only the initial examples assume the absence of transaction costs. The second half of the article goes on to show that “If the situation does have high transactions costs, then it *does* matter where the liability for pollution is placed” (McCloskey 1998, p. 367). Although the Coase theorem has been used to argue against government intervention, the theorem “does not imply, when transaction costs are positive, that government actions (such as government operation, regulation or taxation, including subsidies) could not produce a better result than relying on negotiations between individuals in the market” (Coase 1994 p. 11). Coase’s argument was intended as a critique of abstract economic theory:

. . . the significance of that article is not that zero transaction costs are the definitive realistic case but quite the opposite, that neoclassical economic theory, which implicitly assumes zero transaction costs is therein wrong; and that economic theory should be reformulated to deal effectively with a world of positive transaction costs. (Samuels et al 1997, pp. 74-75)

Unfortunately most mainstream economists have not been persuaded and continue to apply the Coase theorem in ways that are not consistent with Coase’s specification. One of these areas is in textbooks, especially in environmental economics. Medema (2011) suggests rephrasing the Coase theorem may be part of an attempt to make it more applicable to policy:

Thus, the students were treated to statements of the Coase theorem that assumed transaction costs are “low,” “not high,” “less than the gains from exchange,” etc. These subtle changes of wording were necessary to make the Coase theorem operational and thereby opened the door to the possibility of negotiated solutions in the real world—perfectly sensible for textbook discussions of externality policy. But there are two problems here. First, this is not the Coase theorem, nor is it the Coase theorem that was being discussed in the scholarly literature, which continued to deal with the theorem on its own terms—assuming zero transaction costs—even though often unknowingly violating it in the particulars. In short, the students were being taught something that was factually incorrect: the Coase theorem does not say what these textbook authors claimed it said. Second, these positive transaction costs versions of the Coase theorem are false. The invariance proposition does not hold unless the externality is binary, and efficiency is generated only in the Paretian sense. (pp. 12-13)

Applying the Coase Theorem

In the real world transaction costs will undoubtedly exist, and if there are more than two parties involved they will increase greatly. Yet, transaction costs are not the only the only impediments that could prevent Coasean type of bargaining from finding an effective solution.

Cost free transactions are just one of the assumptions of perfect competition, all of which are subject to critiques based on their reasonableness. For instance, perfect competition assumes complete flexibility and substitutability of resources. The unrealistic nature of this assumption is especially apparent in the case of doctor and confectioner. Neither party wishes to, nor would be able to move their business to a different location to avoid the conflict without significant cost. While a farmer may be able to plant oats instead of corn, he can't just decide to go into medicine because the return is higher.

If we factor in changes over time then the optimal strategy could be very different. What if the farmer has ranchers on two sides of his farm? Paying one of the ranchers to stop them from

causing damage would certainly not encourage the other rancher to fence in his cows. If polluters are paid not to pollute they have an incentive to increase the amount of pollution over time.

The legal structure can also have significant effects if there is a divergence between the amount a person would pay for a good (WTP) such as cleaner air, compared to the amount of payment they would accept for dirtier air (WTA). Empirical and experimental evidence suggests that there is no reason to expect these values to be the same. On the contrary, “WTA values are typically found to be from two to seven times as high as WTP” (Goodstein 2005, p. 140). Kahneman and Thaler (1990) argue that simply having an item causes a person to place a higher value on it than they would otherwise. This is referred to as an “endowment effect.” If this effect is present, “then the individual who is assigned the property right to a good will be more likely to retain it” (Kahneman and Thaler 1990, pp. 1339-40). In a series of experiments participants were given or asked to choose between common items such as coffee mugs, pens, and chocolate bars. Depending on the setup they were able to switch for another item or buy and sell. The WTA price was consistently higher than WTA prices even when participants are given easily valued and replaceable goods.

As mentioned above, an information advantage for one party can prevent negotiation from reaching the “efficient” point. Of course a power advantage could do the same such as if one party has more resources to prolong negotiations, or if one party fears the possibility of retaliation.

In general, the analysis of bargaining and game theory ignores social relations. The farmer and the rancher are what we would normally call neighbors, which may entail a different relationship than an impersonal market. For reasons besides transaction costs, the type of

negotiations Coase describes doesn't seem to be a normal method of solving disputes, and in a number of ways people don't often act in rational utility maximizing manner.

These are just a few of many reasons that the reality of applying of the Coase would most likely not resemble the theoretical construction. The theorem is also seen by some in law and economics as a value-free method of deciding between two claims, allowing the courts to avoid making normative judgments. The theorem is applied in situations that are far from the perfect competition assumptions of Coase:

. . . in the case of high transaction costs, the decision maker (be it a court, a legislature, or an administrative agency) should ascertain the result the parties would arrive at if transaction costs were low. Then the decision maker should give the parties that same result. Once again an efficient result (defined as one arrived at without interference from transaction costs) is achieved without the necessity of making any value choices. (Posin 1999, p. 3)

Of course the idea that the courts should be concerned with economic efficiency or maximizing production is a value judgment, one that is likely to conflict with a traditional view of the legal system.

Conclusion

This paper has argued that from a purely theoretical standpoint the Coase theorem is seriously flawed. The theorem is only relevant to cases where property rights are not defined or enforceable and where economic rents are present. Under these conditions the assignment of liability will affect the distribution of income and could affect the value of production. Bargaining between individuals will not necessarily maximize the value of production; private costs and social costs may not be equal. Given that the theorem is internally incoherent and, for the reasons stated

above, cannot be applied to the real world it should be abandoned. Ironically, this conclusion is not far from Coase's own view. Reflecting on the impact of "The Problem of Social Cost," Coase wrote "The world of zero transaction costs turns out to be as strange as the physical world would be without friction...It would not seem worthwhile to spend much time investigating the properties of such a world" (Coase 1988, pp. 14-15). Unfortunately, as Coase recognized, his article provoked extensive discussion that rarely ventured from that strange world. Whether economics today is any closer to the real world is debatable. However, the need to abandon the "imaginary world that exists only in the mind of economists" (Coase 2010, no pg) and turn to the world as it is should be exceedingly clear.

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