The Coasian Analysis of Externalities: Some Conceptual Difficulties

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Abstract

This paper is concerned with two distinct issues flowing from Coase's analysis of externalities and of how courts deal with them. The first issue relates to the domain of validity of the Coase Theorem. It is argued in the paper that if non-pecuniary considerations are brought into the analysis then it can no longer be claimed that the outcome will be efficient regardless of liability assignments. In other words, it is contended in the paper that the validity of the Coase Theorem is crucially dependent on neglect of non-pecuniary considerations from the analysis. From this it follows that if in a context non-pecuniary considerations are important, the use of the Coasean logic can be quite misleading. As in the context of externalities affecting the environment the non-pecuniary considerations tend to be particulary important, different liability assignments can have very different implications for environmental degradation.

The second issue relates to whether the two ideas of efficient allocation of resources being attained through bargaining in a world of zero transaction costs and individualized efficient court decisions are compatible with each other. One implication of individualized efficient court decisions is that it could not be the case that liability assignments are well-defined. In each case, whether the injurer will bear the harm or the victim is contingent on the facts of the case and the requirements of efficiency. Individualized efficient court decisions consequently imply that it could not be the case that law makes injurers liable and also that it could not be the case that law makes injurers not liable. But then the very basis on which bargaining could take place in a world of zero transaction costs disappears. It is argued in the paper that the individualized efficient court decisions not only make the liability assignments ambiguous but also introduce strategic manipulability in the system with its attendant costs.

Keywords: Non-Pecuniary Considerations; Domain of Validity of the Coase Theorem; Coasian Logic and Environmental Issues; Individualized Efficient Court Decisions; Strategic Manipulability of the Efficient Court Decisions.

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The Coasean Analysis of Harmful Interactions: Some Conceptual Difficulties

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1   Introduction

In his seminal paper 'The Problem of Social Cost' Coase advanced the proposition that in a situation where one person's activity results in harm to another, given that transaction costs are zero, there will be efficient allocation of resources regardless of whether the law assigns the liability for harm to the injurer or makes the victim bear the harm. This proposition, now known as the Coase Theorem, notwithstanding some criticisms which were made in the initial years following the advancement of the proposition, is generally regarded as a valid one. Moreover, the proposition constitutes the starting point of the subdiscipline of law and economics. According to the Coase Theorem, in a world of zero transaction costs from the point of view of efficiency it makes no difference as to what the law is as long as long as it is well-defined. As the irrelevance of law is crucially dependent on the assumption of zero transaction costs, it follows that when transaction costs are positive the law does matter. The subdiscipline of law and economics is concerned with analyzing the relative desirability of laws from the perspective of efficiency when transaction costs are not zero.

In addition to advancing the proposition of the Coase Theorem, Coase makes another important point, namely, that the court decisions in general have an underlying economic logic in the sense that they are on the whole what one would expect them to be if the cases were to be decided solely on efficiency considerations. Coase analyzes several court cases and reaches the conclusion of court decisions being in accordance with efficiency considerations on the basis of this analysis.

This paper is concerned with two distinct issues flowing from Coase's analysis of harmful interactions and of how courts deal with them. The first issue relates to the domain of validity of the Coase Theorem. It is argued in the paper that if non-pecuniary considerations are brought into the analysis then it can no longer be claimed that the outcome will be efficient regardless of liability assignments. In other words, the validity of the

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Coase Theorem is crucially dependent on neglect of non-pecuniary considerations from the analysis. From this it follows that if in a context non-pecuniary considerations are important, the use of the Coasean logic can be quite misleading. As in the context of externalities affecting the environment the non-pecuniary considerations tend to be particulary important, different liability assignments can have very different implications for environmental degradation.

The second issue relates to whether the two ideas of efficient allocation of resources being attained through bargaining in a world of zero transaction costs and individualized efficient court decisions are compatible with each other. One implication of individualized efficient court decisions is that it could not be the case that liability assignments are well-defined. In each case, whether the injurer will bear the harm or the victim is contingent on the facts of the case and the requirements of efficiency. Individualized efficient court decisions consequently imply that it could not be the case that law holds injurers liable and also that it could not be the case that law makes victims bear their losses. But then the very basis on which bargaining could take place in a world of zero transaction costs disappears. It is argued in the paper that the individualized efficient court decisions not only make the liability assignments ambiguous but also introduce strategic manipulability in the system with its attendant costs.

The paper consists of, including this introduction, four sections. The second section contains a simple exposition of the Coase Theorem. Section 3 presents an example which shows that the validity of the efficiency thesis of the Coase Theorem is crucially dependent on ignoring the non-pecuniary considerations. The last section is concerned with the implications of individualized efficient court decisions for social costs.

2   The Coase Theorem

There are several versions of the Coase Theorem. One of the simplest states that: Given that transaction costs are zero, the allocation of resources will be efficient regardless of liability assignments. The proposition can be illustrated with the help of an example.

Consider an activity by individual A which if undertaken will result in harm of 10 to individual B. Suppose A is liable for the harm to B resulting from his activity. Individual A will undertake the activity if his gain from the activity is greater than the costs associated with it including liability payment to B; and will not undertake the activity if his gain is less than the costs inclusive of liability payment. For instance, if A's net gain from

the activity exclusive of liability is 12 he will undertake the activity as he stands to gain 2 (net gain exclusive of liability - liability payment = 12 - 10 = 2) by doing so. On the other hand, if his net gain exclusive of liability is 8 then he will not undertake the activity as he stands to lose 2 (net gain exclusive of liability - liability payment = 8 - 10 = -2) if he goes ahead with the activity. When A's gain exclusive of harm to B is 12 the social gain of A's activity is 2, and when his gain exclusive of harm is 8 the social gain is -2. Social costs of A's activity are the sum of private costs to A of undertaking the activity and harm of 10 to B. When A is liable for harm then the activity is undertaken if social gains from the activity exceed the social costs of undertaking it; and the activity is not undertaken if social costs exceed the social gains. Thus, when A is liable socially correct decisions are arrived at.

If A is not liable for harm to B then it might seem that there will be a divergence between social and private costs. Individual A will undertake the activity if his gain from the activity is greater than the costs associated with it. These costs do not include harm of 10 to B as A not being liable does not have to pay for it. The social costs of A's activity, however, include both the private costs to A of the activity as well as harm of 10 to B. From the perspective of the society undertaking of activity by A is gainful only if A's gain from the activity is greater than the social costs associated with it. The divergence between private and social costs, it would seem, can lead to inefficient outcomes. For instance, if A's net gain from the activity is 8 then from social perspective the undertaking of the activity will result in net loss to the society of 2 (harm to B - net gain of A = 10 - 8 = 2). However, it seems that the activity will be undertaken as A stands to gain from it to the tune of 8.

As seen above, if A's activity is harmful to B and A is made liable for the harm then there is no discrepancy between private and social costs. Coase argued that if it is assumed that transaction costs are zero then there will no divergence between private and social costs even if A is not made liable for harm to B. If A is not liable then B will suffer a loss of 10 as a consequence of A's undertaking of his activity. Thus, B will avoid loss of 10 if A does not undertake his activity. Consequently, given that individuals are rational, B will be willing to pay to A a sum of money not exceeding 10 if A in exchange will agree not to undertake his activity. If A's net gain from the activity is 8 he will be quite willing not to undertake his activity provided a sum of money not less than 8 is paid to him. Thus there is room for a deal beneficial to both parties. If a sum greater than 8 and less than 10 is transferred from B to A in exchange for A's agreement not to undertake the activity, both parties will be better-off. Thus, according to Coase regardless of whether A is liable or not for harm to B, given that the net gain to

A from his activity (exclusive of liability) is 8 and harm to B from A's activity is 10, the outcome in either case will be the same, namely, that A will not undertake his activity. When he is liable he does not undertake the activity as the net gain is negative; when he is not liable he does not undertake the activity as he obtains at least as much from B for not proceeding with the activity as he will obtain if he does proceed with the activity.

If the net gain to A, exclusive of liability, is assumed to be 12 instead of 8, the outcome will be undertaking of the activity by A regardless of whether he is liable or not. In case he is liable his net gain from the activity inclusive of liability will be 2 and therefore undertaking of the activity will be worthwhile. In the case of his not being liable, B will be willing to pay him a maximum amount of 10 for his agreement not to proceed with the activity. This offer, however, he will refuse as the undertaking of the activity will fetch him a larger gain of 12. When he is liable his net gain is 2. When he is not liable then also his net gain from the activity is 2 as by going ahead with the activity he foregoes a sum of 10 offered by B. Once again there is no divergence between private and social costs.

When A's net gain from the activity exclusive of liability is 8, the net social gain from the activity is -2; and when the gain from the activity exclusive of liability is 12 the net social gain is 2. Thus in each case the socially desirable outcome results. When transaction costs are zero, i.e., when individuals can costlessly negotiate and make deals then regardless of liability assignment socially efficient outcome will result. When the party whose activity is resulting in harm is made liable for the harm, socially correct decision is arrived at because in calculating the net gain from the activity the party undertaking the activity takes into account the harm that results. Even when the party whose activity is resulting in harm is not made liable for the harm, socially correct decision is arrived at because in calculating the net gain from the activity the party undertaking the activity takes into account the payment from the injured party that it has to forego.

Coase considered similar, though more elaborate, examples to argue that, given that transaction costs are zero, socially efficient outcome will be reached regardless of liability assignment. In fact, in the examples which Coase considered, as indeed in the example considered above, outcome was invariant with respect to liability assignment. Thus by considering some examples Coase reached two conclusions: Given that transaction costs are zero; (i) the allocation of resources which will result through bargaining among rational individuals will be efficient regardless of liability assignments; and (ii) the allocation of resources will be invariant with respect to liability assignments. Thus Coase reached conclusions entirely at variance from what had been the general understanding prior to his contribution.

When A is made liable to B for harm then payment is made to B by A for harm or A does not undertake his activity and therefore B does not suffer harm; and if A is not liable then B suffers the harm or payment is made from B to A. Consequently, when injurers are liable they will be relatively less wealthy compared to when they are not liable. Unless one assumes that both groups of people have the same consumption pattern, the allocation of resources will be different under different liability assignments. Thus the invariance conclusion arrived at by Coase in general will not hold. The efficiency thesis, however, has received wide acceptance. The term 'Coase Theorem' now refers to the efficiency thesis alone. Efficiency thesis of Coase has also been criticized on several grounds. One of the most important criticisms of the efficiency thesis has been made by Regan (1972). He points out that there is no theorem in game theory which says that if by cooperating two players can both benefit then they will invariably do so. Furthermore, if the notion of zero transaction costs is interpreted in a way so that all failures to reach mutually beneficial agreements are ruled out then efficiency becomes part of the definition of zero transaction costs itself. In this paper we will not be concerned with these or similar criticisms of the efficiency thesis. Rather, what will be examined is whether there exist examples of the kind that Coase considered where the logic employed by him will not work, i.e., outcomes will not be efficient regardless of liability assignments.

3   An Example Where the Coasean Logic Is Not Applicable

Suppose a person E owns a small island which is home to several species of flora and fauna not found anywhere else. The island owner will fetch a maximum sum of 1 million in case he decides to sell this island. The person who owns this island is a dedicated environmentalist and is willing to spend enormous sums of money to save the species of flora and fauna found only on this island from extinction. Let us assume that his total wealth is 10.5 million. To protect the species he expends 10 million for making the island highly inaccessible and inhospitable for humans. After the investments the market value of the island falls to zero. Let us also assume that apart from the protection to the species specific to the island, E does not derive any other benefit from the island. Suppose someone (T) decides to set up a factory on a nearby island. The noxious fumes and discharges from the factory are certain to kill off all flora and fauna of the island for whose protection E has spent 10 million. Let us assume that the net gain to the factory owner, exclusive of harm, is 1.5 million. If the factory owner is liable for harm to E, then E's valuation of survival of the species being at least 11 million, he will not find it worth-

while to go ahead with his plans. On the other hand, if he is not liable then the factory will come into existence. The only way that the factory owner can be persuaded not to set up the factory is by making him a payment of at least 1.5 million. This, however, is not feasible as E no longer has enough money to bribe T not to go ahead with his plans.

If T is liable then the factory does not come into existence and the investment made for the species' protection does not go waste. If T is not liable then the factory comes into existence resulting in the destruction of at least 9.5 million of social wealth. Outcome is no longer invariant with respect to liability assignments. Outcome is efficient if T is liable; and inefficient if T is not liable. In this example it is no longer true that the allocation of resources will be efficient regardless of liability assignments. In connection with this example it should be noted that if we had assumed that E's initial wealth was sufficiently high so that E would have been in a position to bribe T by paying him a sum of money not less than 1.5 million the outcome would have been the same and efficient regardless of liability assignments.

In the kind of examples that Coase considered, outcome was both invariant and efficient regardless of liability assignments. Also, the outcome did not depend on the wealth of the parties. The reason why Coase is able to obtain both invariance and efficiency irrespective of liability assignments as well as irrespective of initial wealth positions of the two parties is that in his examples activities of both parties were motivated by profit and consequently subjective valuations coincided with market valuations. For everyone concerned, the valuation of harm done by rancher's cattle is the market value of the crop damaged by the cattle. In the example considered above, however, market valuation and subjective valuation differ. While the market valuation of the island post-investments is zero, we know that E's valuation must be at least 11 million. The validity of the Coase Theorem which states that the allocation of resources is efficient regardless of liability assignments, given that transaction costs are zero, is crucially dependent on either there being no divergence between subjective valuation and market valuation or alternatively on defining the notion of efficiency so narrowly so as to exclude all non-pecuniary wealth from reckoning.

It is possible to reject the calculations of the example under consideration done above on the ground that the only valuations which are relevant are those which are pecuniary. When the factory owner is liable, it might be argued, he will be liable only to the extent of fall in the value of the island because of his actions. As the market valuation of the island was zero even before the harm, there can be no further fall in the island's market value. Now, post-investments E has only .5 million; consequently the maximum amount that he

can offer for anything whatsoever cannot exceed .5 million. If one takes the maximum amount of money E is willing to offer to save the island species as the valuation of harm, it follows that the value of the harm cannot exceed .5 million. Thus whether one measures harm by the fall in the market value of the island or by the maximum amount that E is willing to offer for avoiding the harm, if the factory owner is liable he will have to pay a maximum of .5 million for the harm. As he stands to gain 1.5 million by setting up the factory, his net gain from the factory after liability payments is going to be at least a million and therefore he will go ahead with his plans. When he is not liable then in any case as we saw above he will go ahead with his project as E does not have enough money to persuade him not to undertake setting up of the factory. By ignoring non-pecuniary part of social wealth, one can get back the invariance of the outcome. Furthermore, the outcome can also be characterized as efficient. The factory will contribute 1.5 million of pecuniary wealth; and will destroy, if at all, a maximum of .5 million of pecuniary wealth. Thus coming into existence of the factory will result in increased wealth.

Thus the conclusion that we reach is: The assertion of the Coase Theorem that, given that the transaction costs are zero, allocation of resources will be efficient regardless of liability assignments is not true if efficiency is reckoned in terms of both pecuniary and non-pecuniary wealth. Its validity is crucially dependent on ignoring non-pecuniary part of social wealth. This conclusion is at variance with the general understanding about the Coase Theorem. For instance, Demsetz (1972) in his elucidation of Coase Theorem seems to suggest that the notion of efficiency which is employed there is inclusive of non-pecuniary wealth. The example in the context of which he makes this point is of the system of reserve clause in organized baseball. We discuss his example below.

Under the reserve clause system once a player signed with a major league club he could no longer negotiate with other clubs for the sale of his services. Under the clause, if a major league club wished to acquire the services of a player who was already under contract, it was required to purchase the contract from the club currently owning it. The relevant question is whether the distribution of players among teams would be different in the absence of reserve clause.

Suppose a player not subject to the reserve clause plays for Club A and receives $15000 from it; and that both Clubs A and B value the player's services more than $15000. Let the excess of valuation by Club A of player's services over $15000 be α; and the excess of valuation by Club B of player's services over $15000 be β. If β is greater than α, then it would be in B's interest to make an offer to the player of a sum greater than $(15000+\alpha)$ and less than $(15000+\beta)$ and in A's interest not to make a higher counteroffer. If β is

less than α, then the most that B can offer to the player is $\$(15000+\beta)$. But, now it would be in A's interest to make a higher counteroffer and retain the player. Thus, when the player is not subject to the reserve clause he will play where his services are valued most highly. Next consider the case when the reserve clause is effective. Suppose as before that the player is with A and receives \$15,000. First consider the case when α is less than β. It is clearly in B's interest to offer to A a sum greater than $\$\alpha$ and less than $\$\beta$ for the player's contract, and in A's interest to accept the offer. If, however, β is less than α then the maximum amount that B would be willing to offer A for the player's contract is $\$\beta$, which A of course would not find in its interest to accept. The condition under which the player is transferred to B when he is subject to the reserve clause is precisely the condition under which he will elect to transfer to Club B when he is not subject to the reserve clause. Demsetz adds:

'The reader may object, suggesting that nonpecuniary considerations might make the distribution of players different depending on the legal status of the reserve clause. But this objection also would be in error. Suppose that the player, presently owned by a California club, has developed a preference for working in California. If there were no reserve clause, his preference would lead him to ask at least \$1,000 more to play ball with a Chicago club than he earns playing for a California club; and, in the absence of a reserve clause, a Chicago club would need to bid \$1,000 more than a California club to obtain his services. But this is also true with the reserve clause. Under reserve clause arrangements, suppose that the Chicago club offers the California club only \$500 more than the player's net value to the California club. The California club, indeed, will be tempted to sell the player's contract to Chicago. It appears that the \$500 increment, which would be too small to move the player were there no reserve clause, is large enough to move him if there is a reserve clause. This is incorrect because the player, when working under the reserve clause arrangement, would be willing to offer a sum of up to \$1,000 (the value of the nonpecuniary amenities to him of California) to the California club to induce it to refuse to sell his contract to Chicago. Any amount above \$500 would be sufficient to make the California club reject Chicago's offer since Chicago is offering only \$500 more than the player is worth to the California club. (The player can "offer" such an amount by accepting a pay reduction.) With or without the reserve clause, then, the player will locate where the value he places on amenities plus the value of his baseball talent is greatest.'

In the context of this example it is indeed true that with or without the reserve clause the player will locate where the value he places on amenities plus the value of his baseball talent is greatest as claimed by Demsetz. But the proposition is not true in general. Consider for instance the case when the non-pecuniary benefits that the player derives

from living in California is $20000, his services are worth $32500 to the Chicago club and $16000 to the California club. Also assume that his wealth, over and above what is needed for subsistence, is zero. The sum of non-pecuniary benefits and value of his services is greater in California being $36000 ($20000+$16000) then in Chicago where it is $32500 ($0+$32500). If there is no reserve clause, the player will locate in California. The maximum that the Chicago club would be willing to offer to the player is $32500. On the other hand any offer from the California club exceeding $12500 has a worth for the player greater than $32500. An offer by the California club greater than $12500 and less than $16000 being beneficial to both the player and the club will be made and accepted. If, however, there is a reserve clause and the player initially is with the California club then he will move to Chicago. Suppose the player is receiving an amount $$y$ greater than $12500 and less than $16000. Then, an offer by the Chicago club for the player's contract in exchange for a sum greater than $(16000-$y$)$ and less than $(32500-$y$)$ will benefit both the clubs. Therefore, if an offer is made for the contract in exchange for $(32,100-$y$)$ then it will be accepted. The player, having only remuneration of $$y$, which is less than $16000, will not be able to persuade the California club not to sell the contract. It is clear that if non-pecuniary benefits are taken into account then it is not invariably true that the outcome will be efficient regardless of property or liability assignments, efficiency being interpreted inclusive of pecuniary as well as non-pecuniary gains.

From the kind of examples considered by Coase and the ones considered here, it seems reasonably clear that if transaction costs are assumed to be zero then:

(i) If both parties to the interaction are solely motivated by profit, i.e., pecuniary considerations, then (1) the outcome will be efficient regardless of property or liability assignments as the case may be; and (2) the outcome will be invariant with respect to property or liability assignments as the case may be. In other words, if both parties to the interaction are solely motivated by pecuniary considerations then the proposition of the Coase Theorem would hold. The examples considered by Coase on the basis of which he reached the conclusion contained in the Coase Theorem fall into this category.

(ii) If one of the two parties to the interaction is solely motivated by pecuniary considerations and the other party is at least partly motivated by non-pecuniary considerations, then (1) the outcome will be efficient if property right is assigned to the party which is at least partly motivated by non-pecuniary considerations or liability is put on the party which is solely motivated by pecuniary considerations as the case may be; but not necessarily if property right is assigned to the party which is solely motivated by pecuniary considerations or liability is put on the party which is at least partly motivated by non-

pecuniary considerations as the case may be; and (2) the outcome in general will not be invariant with respect to property or liability assignments as the case may be.

(iii) If both the parties to the interaction are at least partly motivated by non-pecuniary considerations, then (1) the efficiency or otherwise of the outcome will depend on which party is assigned the property right or which party is made liable as the case may be; and (2) the outcome in general will not be invariant with respect to property or liability assignments as the case may be.

If rules, laws and policies are determined on the basis of the Coasean logic or on the basis of a notion of efficiency which neglects non-pecuniary considerations, then they can lead to highly undesirable situations by bringing about destruction of non-pecuniary wealth, particularly in cases where non-pecuniary considerations are of the greatest importance for those adversely affected. As is clear from the island example discussed earlier, the use of the Coasean logic in general will be highly destructive of the environment and the ecological integrity by its neglect of the non-pecuniary considerations relating to them. The rules, laws and policies based on the Coasean logic or on a narrow notion of efficiency concerned solely with the pecuniary aspects are also likely to result in great injustice for the indigent including violations of their basic rights. This can be seen with the help of a simple example.

Suppose A's gain from his polluting activity results in a net gain to him of 100 and harm in the form of a disease for B. Assume that it is possible to prevent the disease altogether by a medicine costing 10. The disease as such is incurable and results in great suffering for the afflicted. B is an indigent person and lives a subsistence existence. If A is liable for harm then A will ensure provision of medicine for B and have a net gain of 90. If A is not liable then B not being in a position to afford the preventive medicine will contract the incurable disease. Whether the outcome in which B suffers from the disease is efficient or not is a matter of definition. If for instance it is the case that an average person with an average income would be willing to pay at least 1000 for getting rid of the disease and one is willing to use this figure in B's context then we reach the conclusion that when A is not liable the outcome which is arrived at is inefficient. On the other hand if one values the harm on the basis of the maximum amount that B is willing to pay to get rid of the disease, a figure close to zero on account of B's indigence, we will find the outcome efficient. Regardless of how one characterizes the outcome as far as efficiency is concerned, the great injustice involved in the situation and its being violative of basic rights is not in doubt.

4   The Coasean Logic and Economic Analysis of Law

Acceptance of the Coase Theorem implies that when transaction costs are zero the law is irrelevant from the perspective of economic efficiency. The law is irrelevant in the sense that it makes no difference as to which of the two parties to an interaction is made to bear the harm consequent upon the interaction. In the rancher-farmer example discussed at length by Coase it makes no difference whether the rancher bears the harm caused by his cattle or the farmer whose crops are destroyed by the straying cattle. Whether ranchers are liable or not liable, given zero transaction costs, the parties will reach an agreement which will maximize the joint gains. What happens if transaction costs are not zero?

If transaction costs are positive but less than the surplus which can be reaped by negotiating and making a deal, then it would still be in the interest of the two parties to come to a mutually beneficial agreement. Suppose A's (injurer) activity is harmful to B's (victim) activity. When A's activity is not there, net gain to B from his activity is 10. The net gain to A from his activity is 20; and his activity inflicts harm of 12 on B's activity. It is clear that the socially optimal situation is where only A undertakes his activity as it would result in a net social gain of 20. If both A and B undertake their activities then the net social gain will be 18; and if only B undertakes his activity the net social gain will be 10. If transaction costs are zero, using the Coasean logic it is easy to see that B will abandon his activity. If A is liable for harm, A will pay a sum between 10 and 12 to B for abandoning his activity. If A is not liable then B will not find it worthwhile to continue his activity. When A is liable then there is a surplus of 2 which can reaped by A and B by coming to an agreement on the abandonment of the activity by B. If transaction costs are positive but less than 2, say 1, there is still a surplus of 1 which the two parties can divide up by reaching an agreement. Thus as long as transaction costs are less then the joint gains from an agreement, an agreement will be reached to abandon the activity by B. The net social gains, however, will differ depending on who is liable. If A is liable then the net social gain will be (20 - transaction costs); and if A is not liable then the net social gain will be 20. If transaction costs are greater than 2 then clearly no negotiations will take place. If A is liable then the net gain to the society will be only 18 as both the activities will be undertaken. If A is not liable B will abandon his activity and the net social gain will be 20.

Thus, when transaction costs are positive then the law does matter from the perspective of efficiency. In the context of the above example it is better from the point of view of efficiency not to make A liable. By changing the figures we might find that it is better to make A liable. The general conclusion that emerges is that if wealth maximization is the sole objective then in deciding whether to make injurers or victims bear harm due to interaction, one has to look at the total effect of the liability assignment. If in all cases

of interaction of a particular kind, say rancher-farmer interactions, transaction costs are zero then each of the two liability assignments, namely making ranchers liable for harm and not making ranchers liable for harm, will work equally well from the perspective of efficiency. If, however, there are all kinds of cases, cases with zero transaction costs and cases with positive transaction costs, cases with low transaction costs and cases with high transaction costs, then in order to determine which liability assignment will be better one has to look at the aggregate net social gain which will result with each of the two liability assignments. The liability assignment which results in the higher net social gain is to be preferred on efficiency considerations. The economic analysis of law, beginning with the Coasean contribution, however has proceeded quite differently. We discuss the law and economics approach below and the conceptual difficulties that it raises.

In the context of the Coase Theorem it is important to remember that, under the assumption of zero transaction costs, while it makes no difference as to which party is made liable, the liability assignment must be clearly defined as has been rightly pointed out by Coase:[1]

'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.'

Thus for market transactions to work we need clearly defined liability assignments. But, if court decisions are based on individualized efficiency considerations then the assignment of property rights or of liability will not be well defined. Consider for instance the following three cases with prohibitively high transaction costs to be litigated in court. One involves a rancher-farmer interaction in which net gain from ranching is 10, net gain from farming 2 and harm from straying cattle 4. The second involves a rancher-farmer interaction in which net gain from ranching is 2, net gain from farming 10 and harm from straying cattle 4. And the third involves a rancher-farmer interaction in which net gain from ranching is 10, net gain from farming 10 and harm from straying cattle 4. If the court decides all three cases on efficiency considerations then in the first case it will hold rancher not liable and in the second case liable for harm. How the third case will be decided by a court solely motivated by efficiency is indeterminate as either liability assignment will result in efficiency. If the answer to the question whether a particular rancher is liable or not is going to depend on the facts of the case, then clearly it is neither

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[1]Coase (1960) p. 8.

a case of rancher liability nor a case of farmer liability. But this destroys the very basis on which market transactions take place for transferring and recombining rights.

Economic analysis of law done by economists, following Coase's lead, has shown that there is an underlying economic logic in the way courts decide cases.[2] In the light of his discussion of several court cases Coase remarks:[3]

'Nevertheless it is clear from a cursory study that the courts have often recognized the economic implications of their decisions and are aware (as many economists are not) of the reciprocal nature of the problem. Furthermore, from time to time, they take these economic implications into account, along with other factors, in arriving at their decisions. The American writers on this subject refer to the question in a more explicit fashion than do the British. Thus, to quote Prosser on Torts, a person may

make use of his own property or . . . conduct his own affairs at the expense of some harm to his neighbors. He may operate a factory whose noise and smoke cause some discomfort to others, so long as he keeps within reasonable bounds. It is only when his conduct is unreasonable, *in the light of its utility and the harm which results* [italics added], that it becomes a nuisance..... '

If we accept the proposition that by and large courts decide cases of harmful inter-actions of the kind discussed by Coase on efficiency considerations then it follows that it could not be the case that liability assignments are well defined. Consequently the very basis on which market transactions can take place disappears. In each case of harmful interaction a court verdict is required to settle the question of liability.

Even if we assume that it is a matter of common knowledge that courts invariably decide cases on the basis of efficiency, there will still be a class of situations where the courts can decide either way without in anyway diluting the efficiency objective. Each case belonging to this class of interactions must be litigated for fixing the liability assignment. There is another important consequence of making liability assignment dependent on the facts of the case as will necessarily happen if cases are decided on the basis of individualized efficiency considerations. In some instances individuals will find it advantageous to make socially wasteful investments so as to change the nature of interaction in such a way that efficiency considerations on an individualized basis will imply a change of assignment in their favour. Consider for instance a simple example based on a court

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[2]See Cooter and Ulen (2003), Landes and Posner (1987), Miceli (1997), Posner (2007), Shavell (1987) and cases and references cited therein.

[3]Coase (1960) p. 19.

case discussed by Coase.

The case Adams v. Ursell concerned a fried fish shop which had been set up in a predominantly working-class district near houses of 'a much better character'. The judge commented: 'It was urged that an injunction would cause great hardship to the defendant and to the poor people who get food at his shop. The answer to that is that it does not follow that the defendant cannot carry on his business in another more suitable place somewhere in the neighbourhood. It by no means follows that because a fried fish shop is a nuisance in one place it is a nuisance in another.' Coase writes: 'In fact, the injunction which restrained Mr. Ursell from running his shop did not even extend to the whole street. So he was presumably able to move to other premises near houses of 'a much worse character,' the inhabitants of which would no doubt consider the availability of fish-and-chips to outweigh the pervading odour and 'fog or mist' so graphically described by the plaintiff. Had there been no other 'more suitable place in the neighbourhood,' the case would have been more difficult and the decision might have been different.'

From the comments by the Judge and the analysis of the case by Coase, it is clear that whether the fried fish shop constitutes a nuisance crucially depends on a comparison of the harm to those living in the neighbourhood (h) and the loss which will be occasioned by moving the shop to a less convenient place (l). If $h > l$ then the shop constitutes a nuisance but not otherwise. If the shop is a nuisance then the loss of l will be borne by the shop; and if the shop is not a nuisance the the harm of h will be borne by those living in the neighbourhood. Suppose it is the case that $h > l$. If the matter goes to court then the judgment will be against the shop owner and he will incur loss of l. Suppose the shop owner can make an investment which will increase his loss, in the event he has to move to a different location, to a level greater than h. Let l' denote the loss in the event the shop has to be moved to a different location after the investment has been made. If the matter goes to court now, the shop will not be found a nuisance as $l' > h$. There will of course be some loss associated with the undertaking of the investment. Let the loss incurred by the shop owner because of undertaking of the investment in question be d. Now, it can easily be the case that $d < l$, in which case the shop owner will benefit by undertaking the investment. As the shop is a nuisance if investment is not undertaken, and is not a nuisance if investment is undertaken; it follows that the social costs of interaction when the investment is not undertaken are l; and when ivestment is undertaken they are $h + d$. Thus, from the efficiency perspective the situation in which the shop owner undertakes the investment is worse than the situation in which he does not. If courts are going to assign liability on individualized efficiency considerations then in general interaction situations will give rise to strategic possibilities entailing wasteful use of resources.

It is clear from the above analysis that there is tension between Coase's observation (and Law and Economics demonstration) that there is an underlying economic logic in the way courts decide cases and the logic of the Coase Theorem. The Coase Theorem tells us that as long as liability assignments are unambiguous, given that transaction costs are zero, the allocation of resources will be efficient. It makes no difference whether the liability assignment makes the injurer bear the loss due to interaction or makes the victim bear the loss. If transaction costs are not zero in all cases, then the additional social costs over and above what they would have been had the transaction costs been zero in all cases will depend on both the factual situation and the liability assignment which is chosen. Let v, i, h and t denote gain from victim's activity, gain from injurer's activity, harm due to interaction, and transaction costs respectively. The cases of interaction can be categorized as follows: (1) $(h \leq v \wedge h \leq i) \vee (h > v \wedge h > i \wedge i = v)$. In these cases there is no surplus to negotiate about. Consequently there are no additional costs of interaction. (2) $h > v \wedge h \leq i$. If victim is made to bear his loss he will cease his activity, so there will be no additional costs of interaction. If injurers are liable then in case $t < h - v$, there will be a negotiated settlement under which victim will discontinue his activity; and in case $t \geq h - v$, it will not be possible to avail of any part of the surplus of $h - v$. Thus additional costs of interaction will be t in case $t < h - v$ and $h - v$ in case $t \geq h - v$. When injurers are liable, let the total additional costs of all cases of this category be C_2. (3) $h \leq v \wedge h > i$. If injurer is not liable then in case $t < h - i$, there will be a negotiated settlement under which injurer will discontinue his activity; and in case $t \geq h - i$, it will not be possible to avail of any part of the surplus of $h - i$. Thus additional costs of interaction will be t in case $t < h - i$ and $h - i$ in case $t \geq h - i$. If injurer is liable he will cease his activity, so there will be no additional costs of interaction. When injurers are not liable, let the total additional costs of all cases of this category be C_3. (4) $h > v \wedge h > i \wedge v > i$. If injurer is not liable then in case $t < v - i$, there will be a negotiated settlement under which injurer will discontinue his activity; and in case $t \geq v - i$, it will not be possible to avail of any part of the surplus of $v - i$. Thus additional costs of interaction will be t in case $t < v - i$ and $v - i$ in case $t \geq v - i$. If injurer is liable he will cease his activity, so there will be no additional costs of interaction. When injurers are not liable, let the total additional costs of all cases of this category be C_4. (5) $h > v \wedge h > i \wedge i > v$. If victim is made to bear his loss he will cease his activity, so there will be no additional costs of interaction. If injurers are liable then in case $t < i - v$, there will be a negotiated settlement under which victim will discontinue his activity; and in case $t \geq i - v$, it will not be possible to avail of any part of the surplus of $i - v$. Thus additional costs of interaction will be t in case $t < i - v$ and $i - v$ in case $t \geq i - v$. When injurers are liable, let the total additional costs of all cases of this category be C_5.

Thus it follows that if the liability law makes injurers liable then the additional costs of interaction will be $C_2 + C_5$; and in case the liability law makes the victims bear their losses the additional costs of interaction will be $C_3 + C_4$. Therefore it follows that from the point of view of minimizing social costs, it is better to make injurers liable if $C_2 + C_5$ is less than $C_3 + C_4$; better to make victims bear their losses if $C_2 + C_5$ is greater than $C_3 + C_4$; and a matter of indifference whether to make injurers liable or make victims bear their losses if $C_2 + C_5 = C_3 + C_4$.

The above conclusions crucially depend on there being no ambiguity as to what the law regarding liability is. This of course implies that courts in all cases relating to a particular kind of interaction must uniformly apply the law. That is to say, in all cases liability must be put on the injurers or in all cases liability must be put on victims. If courts in some cases put liability on injurers and in some cases on victims, as they must if they are to decide each case on individualized efficiency considerations, then it would imply the non-existence of any clear assignment of liability, destroying the very basis for private bargaining, and hence for application of the Coase Theorem. Even when transaction costs are zero, litigation may become necessary merely for the purpose of finding out which of the two parties to the interaction must bear the loss occasioned by the interaction.

Even if it is assumed that everyone knows that the courts invariably decide cases on individualized efficiency considerations, in certain cases the litigation will still be required to determine who the liability holders are. In particular, in all cases where maximization of social gains requires that both parties undertake their activities, litigation will be required to determine who is to bear liability. In addition to the litigation costs, there will be, as discussed earlier, costs associated with strategic manipulations. There is no reason why the sum of litigation costs and the costs associated with strategic manipulations cannot be greater than the additional costs on account of transaction costs and losses due to inefficiency when courts uniformly decide cases on the basis of fixed liability law. From this it follows that even if it is true that there is an underlying economic logic in the way courts decide cases in the sense that the court decisions mimic the decisions which would have been arrived at if the cases had been decided solely on efficiency considerations, this fact may be devoid of any significance from the perspective of efficiency. Furthermore, this fact will also imply that one of the conditions for the applicability of the Coase Theorem, namely, clear and unambiguous liability assignments does not hold.

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