I. A More Complete Description of Transaction Costs

Our analysis thus far has depended crucially on the notion of transaction costs. The Coase Theorem told us that, when transaction costs are zero, efficient outcomes will always be achieved via private transactions regardless of the legal rule. That was one use of the transaction cost notion, but not the most important. In the real world, transaction costs are not zero. That means we have to identify the types of transaction costs that will occur and the consequences they will have. We then try to select legal rules that will minimize the impact of transaction costs.

Some transaction costs are straightforward. It is costly and time-consuming to conduct any transaction, even relatively simple ones like buying a beer at the 7-11. We have to spend resources communicating, effecting the transfer of goods and cash, etc. In less simple transactions, we may also have to spend resources writing up a contract, and even more resources must be spent enforcing whatever agreement we reach.

All of the above transaction costs are fairly straightforward. But other types of transaction cost are much more complex, because they arise from the existence of strategic behavior. Strategic behavior is behavior that people engage in to take advantage of the interdependence of our actions. We have talked about three types of problem that can arise from strategic behavior: bilateral monopoly, public goods, and holdouts. Our goal now is to look at these more carefully.

II. The Game of Chicken

Two teenagers make a bet: They will get in their cars and drive toward each other at high speed. If one guy swerves while the other guy drives straight, the swerver has to pay the other guy $1000. If both swerve, it's a draw. If both drive straight, they have a spectacular wreck. The payoffs for this game are like so:

<table>
<thead>
<tr>
<th></th>
<th>Straight</th>
<th>Swerve</th>
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</thead>
<tbody>
<tr>
<td>Straight</td>
<td>-$8000, -$8000</td>
<td>$1000, -$1000</td>
</tr>
<tr>
<td>Swerve</td>
<td>-$1000, $1000</td>
<td>0, 0</td>
</tr>
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</table>

Now, what will be the outcome of this game? Well, if you definitely think the other guy will go straight, then you'll swerve. And if he thinks you're going to swerve, he'll certainly go straight. So it certainly seems like {Swerve, Straight} is an equilibrium of this game. Nobody has an incentive to change their behavior, given what the other guy is going to do.

But what if he definitely thinks you'll go straight? Then he'll swerve. The logic above works in reverse just as well, so we conclude that {Straight, Swerve} is an equilibrium as
well. So we have two equilibria to this game, and no particular means of predicting the outcome. (Note that the other two cells cannot be equilibria, because someone always has an incentive to change his behavior.)

So which equilibrium will occur? Obviously, the answer depends on the players' beliefs about each other, which in turn depends on things like commitment and reputation. If a player has a history of always going straight no matter what, he will likely win this game every time he plays. This might seem "irrational," but notice that it's totally rational to try to establish a reputation for being irrational in this manner. In games like this, we therefore expect (some) players to expend a great deal of effort trying to establish a reputation for always going straight.

Reputation is really just a specific kind of commitment strategy. A commitment strategy is one that tries to convince the other player that you will always play tough, perhaps because you really have no other choice. For example, in the movie "Footloose," Kevin Bacon's girlfriend ties his shoelaces to the tractor he's riding during the game of Chicken.

Games like this are not uncommon. International relations is a field rife with examples. Consider whether or not to establish a militaristic posture vis-à-vis other nations in disputes. Going to war is a costly activity, and if you know others are willing to go to war with great frequency, you're better off not being militaristic and just giving in for most disputes. On the other hand, if you know others are going to give in, it makes sense to be militaristic. This is a classic game of "Chicken," and in a context where it's played again and again -- as it certainly is in the international arena -- we should not be surprised to see some nations trying to establish reputations as "Hawks" instead of "Doves."

Nations that do this successfully will, somewhat paradoxically, not generally have to fight, and they will thus usually get what they want -- except on the occasions when they happen to have a run-in with another Hawk. Iraq is probably a good example (the U.S. is the other hawk).

III. Bilateral Monopoly

One of the reasons it's so simple to buy a beer at a 7-11 is that there is a well-established market for beer. As a result, the price of beer is known to any regular purchaser of beer. If any store substantially deviates from the market price, customers can just go elsewhere. As a result, there's no need for you and the store clerk to haggle over the price -- you either buy it for the marked price or you don't. End of story.

But the story is much different if you're buying a unique piece of furniture from an antique store. Any antiques buyer knows that the posted prices are just starting points, or possibly intended only for the naïve customer. If you want to buy the item, you'll have to haggle and bargain with the store owner, and that could take a good deal of time.

Say that you want to buy a 19th century rocking chair. It's worth $1000 to you, but only $500 to the dealer. Any price between $500 and $1000 will make both of you better off. But obviously, you want a lower price and he wants a higher price. Now, if there were a
well-established market for this particular item, and the market price were $750, you'd just pay the price and be done with it. But since there's not, you have a bargaining game to play. To simplify the explanation, let's say that each of you can either accommodate by agreeing to the other guy's demand, or you can be a hard-bargainer by asking $600 (your demand) or $900 (the seller's demand). If you both accommodate, you'll split the difference at $750. Then the game looks something like this:

<table>
<thead>
<tr>
<th></th>
<th>Hard Bargain</th>
<th>Accommodate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Bargain</td>
<td>0, 0</td>
<td>400, 100</td>
</tr>
<tr>
<td>Accommodate</td>
<td>100, 400</td>
<td>250, 250</td>
</tr>
</tbody>
</table>

It should be apparent that this is just another game of "Chicken," with the same attendant problems. Any bargain is better than no bargain, and from an efficiency perspective, any of these bargains (any cell except upper left) is just as good. But from an individual perspective, some bargains are better than others. In the process of holding out for the better bargain, both you and the seller may waste a lot of time -- and possibly end up not reaching a bargain at all.

Obviously, this kind of bargaining problem can arise any time there is a "pie division" problem, meaning a situation where some gains from trade must be divided among a small number of parties. We call such situations "bilateral monopolies," because there is one buyer and one seller. In bilateral monopolies, we should not be surprised to see the commitment strategies and reputation-building strategies adopted in the Chicken game.

Examples:
- Union and management bargaining over wage contracts. Strikes and shut-outs are frequent means by which the parties attempt to demonstrate their willingness to fight rather than accommodate.
- Bargaining over cancellation of a contract. Say two parties write up a contract, and then circumstances change so that one party wishes to breach the contract. If breaching the contract saves this party a greater amount than the other party would lose, then it's efficient for the contract to be broken. The remedy of specific performance requires the breaching party to meet his contractual obligations unless the other party agrees to let him off the hook. Clearly, this creates a bilateral monopoly, with its potential for bargaining breakdown. It is probably for this reason that courts have generally supported the damages remedy instead. (We'll talk about this more when we get to the contracts section of the course.)

IV. The Holdout Problem

The holdout problem discussed in the context of the railroad-farmer example turns out to be another example of the Chicken game. But it's even more complex, because it's two Chicken games at once.

In the railroad-farmer story, assume there are two farmers and one railroad. Suppose that the legal rule is a property right by the farmers: each farmer can prevent the railroad
from using trains without spark catchers. And suppose that sparks cost each farmer $400 while a spark catcher costs the railroad $900, so that it's efficient to throw sparks. (Assume that switching to clover is not an option, for simplicity.)

To see the first Chicken game, suppose that the railroad will passively accept whatever price the farmers demand so long as the total price is less than or equal to $900. And to simplify the problem, suppose that each farmer will either accommodate by asking $425 or hold out by asking $475. Then the payoff matrix looks like so:

<table>
<thead>
<tr>
<th></th>
<th>Hold Out</th>
<th>Accommodate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hold Out</td>
<td>0, 0</td>
<td>75, 25</td>
</tr>
<tr>
<td>Accommodate</td>
<td>25, 75</td>
<td>25, 25</td>
</tr>
</tbody>
</table>

It should be clear from observation that \{Hold Out, Accommodate\} and \{Accommodate, Hold Out\} are the two equilibria. But as in previous Chicken games, we know that the players may try to influence which equilibrium occurs by trying to establish reputations as hard bargainers, and the result could be waste or even (in the extreme) no bargain at all.

But now let's suppose that the farmers manage to reach an agreement. They decide they will always demand the same price, rather than each trying to get a larger share of the proceeds. Then we can now treat the farmers as though they are just one party demanding a single price (that they will split between them). So what price should they charge? If we continue to treat the railroad as a passive agent, then obviously they should charge $450 each (or $900 total). But the railroad is not just passive, because $100 in gains from trade are being divided here, and there's no reason the railroad can't demand some part of it. So now we're in a bilateral monopoly, with the railroad on one side and the farmers' collective on the other.

What makes the holdout problem so difficult is that it's two bilateral monopolies stacked on top of each other. Another way of looking at it is to see the situation as a trilateral (or multilateral) monopoly, where the gains from trade are to be divided among three (or more) parties.

The holdout problem is not insurmountable; the farmers could, for instance, write up a contract in which they agree to cooperate. But writing up such a contract is costly, so the holdout problem is rightly considered a source of transaction costs.

V. The Coase Theorem vs. The Hobbes Theorem

Robert Cooter, in his article, "The Cost of Coase," argues that the Coase Theorem is essentially wrong because it fails to take into account bargaining problems like the ones discussed above. Really, this conclusion is based on a different definition of transaction costs.
In the definition I've given you of the Coase Theorem, I was defining the problems arising from bilateral monopoly as a kind of transaction cost. Sometimes these problems are large, in which case the Coase Theorem's conditions fail, while other times they are small or non-existent, in which case the Coase Theorem's conditions hold. Cooter, however, does not consider the problems arising from bilateral monopoly to be a species (or source) of transaction cost. He defines transaction cost more narrowly, and then observes (correctly) that the Coase Theorem may fail when bilateral monopoly occurs, even if (other) transaction costs are zero.

So when Cooter contrasts the Coase Theorem with the "Hobbes Theorem," he is thinking of a stronger version of the Coase Theorem that asserts bargaining problems are never an impediment to reaching efficient outcomes. To sharpen the argument, he articulates an alternative theorem, the Hobbes Theorem, which asserts that bargaining problems are always an impediment to reaching efficient outcomes.

These two different "theorems," which would better be termed "postulates," can be used to characterize different attitudes about the proper role of the courts. If you're a proponent of the Coase Theorem (Cooter version), you think bargaining is not a problem, so you're concerned primarily with establishing legal rules that minimize transaction costs (of other varieties). But if you're a proponent of the Hobbes Theorem, you think bargaining is a serious problem, so you are most concerned with minimizing the bad results that come from bargaining failures.

VI. The Prisoners' Dilemma & Public Goods

Despite the prevalence of Chicken, there's another game that is just as important: the Prisoners' Dilemma.

Two partners in crime are arrested by the authorities and placed in separate rooms. Each one is visited by the district attorney. The DA says that if both criminals remain silent ("mum"), he'll only have enough evidence to convict them of minor offenses, jailing them for one year each. If one of them rats on the other ("fink") while the other guy stays silent, the rat will get off scot-free while the other guy goes to jail for 10 years. Finally, if both of them rat on each other, they will both be convicted and go to jail for 5 years each.

<table>
<thead>
<tr>
<th></th>
<th>Mum</th>
<th>Fink</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mum</td>
<td>-1, -1</td>
<td>-10, 0</td>
</tr>
<tr>
<td>Fink</td>
<td>0, -10</td>
<td>-5, -5</td>
</tr>
</tbody>
</table>

By looking at this picture, we can see that for player 1, F is the best response to M (0 > -1), and F is also the best response to F (-10 > -15). The same is true of player 2. So we predict that the outcome of this situation will be that both players fink. This is an example of a dominant strategy equilibrium.

The key feature of the Prisoners' Dilemma, and what makes it so intriguing, is that we predict an equilibrium whose payoffs are clearly worse (for both players) than the payoffs
that would have resulted from different actions by the players. Thus, it is a situation in which individual rationality leads to an outcome that is socially irrational (from any player's perspective). In other words, the equilibrium is not Pareto efficient.

There are numerous applications of the PD, but for now I'll focus on just one: the public good problem. The public good problem arises because there are some goods that, once bought, benefit even people who haven't paid for them. Another way of saying this is to observe that the cost of paying for some goods is concentrated on the buyer, while the benefits are dispersed among a large group. The problem arises because each person has an incentive to free ride on the contributions of others rather than contributing himself; if too many people try to free ride, the good may not get bought, or it may get provided at a suboptimal level.

Take the case of farmers who need to pay off a railroad to install a spark catcher. Now, when there is just one spark catcher to be bought, it turns out that this "public good problem" is just a kind of holdout problem in reverse. Either the spark catcher gets installed or it doesn't, and the only issue is the distribution of the gains from its installation. But suppose you could buy more than one spark catcher. Each spark catcher will save each farmer $500 at a total price of $700. Say there are two farmers, each of whom can either contribute $700 or not.

<table>
<thead>
<tr>
<th></th>
<th>Contribute</th>
<th>Don't</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribute</td>
<td>$300, $300</td>
<td>- $200, $500</td>
</tr>
<tr>
<td>Don't</td>
<td>$500, - $200</td>
<td>0, 0</td>
</tr>
</tbody>
</table>

By inspection, you can see that "Don't" is the dominant strategy, and as a result we expect both parties to try free ride and the spark catchers not to get installed.

There are ways to get around this problem, of course. The farmers can see they're in a PD, and they can do things to get around it. For instance, they could write up a contract in which each one agrees to contribute. This contract would result in both contributing, which is much better than the PD outcome, so it's in both their interests to sign it. (But if you want to see what could go wrong, imagine that each farmer can write his own version of the contract and then try to convince the other to sign it…) Like holdout problems, public good problems are not insurmountable, but surmounting them is often costly. The cost of overcoming the public good problem is a kind of transaction cost.