Economics 522: Law and Economics **Email: jebecker3@wisc.edu**
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Handout #2: The Coase Theorem

Review

Theorem: (The Coase Theorem) If property rights are well-defined and tradable, then in the absence of transaction costs voluntary negotiations will lead to efficiency.

Notice the conditions for achieving efficiency:

1. Property rights must be well-defined.
2. Property rights must be tradable.
3. Transaction costs must be absent.

These conditions are stated as *sufficient conditions*, but not *necessary conditions*. So we can make the following observations:[1]

- To the extent that we believe the Coase Theorem, if voluntary negotiations *do not* lead to efficient outcomes, then we should expect one of the three conditions to fail.
- If one or more of the conditions do not obtain, then voluntary negotiations *may not* lead to efficient outcomes (but this *does not* imply that voluntary negotiations *never* lead to efficient outcomes).

What might cause these conditions to fail, and how might these failures be remedied? Let's look at this through the lens of the noisy party example.

1. Well-Defined Property Rights: Property rights are ill-defined if local noise ordinances fail to specify whether there is a right to create noise, or a right to enjoy peace and quiet. Essentially, law would need to specify a *default state*, so that parties come to the negotiating table with a mutual understanding of what happens if bargaining "fails."
2. Tradable Property Rights: Property rights are not tradable in this situation if agreements reached through bargaining are unenforceable. If the law defines a right to create noise, but neighbors reach an agreement to *not* stay quiet, there ought to be a mechanism for holding the potential-noisemakers to their agreement.
3. No Transaction Costs: Bargaining imposes transaction costs if negotiation is burdensome to either party. These burdens might be monetary (the cost of writing up a legally enforceable agreement), or non-monetary (the opportunity cost of time spent negotiating). A transaction-cost-minimizing law might enforce verbal agreements when money changes hands, even when a formal contract is not drafted.

Two quick notes about efficiency and the Coase Theorem:

- If the conditions of the Coase Theorem are met, then the law does not explicitly need to consider efficient possession. In the *Post* case discussed in lecture, the court did not consider which party valued the fox more, but instead considered which law would create efficient incentives for future cases.
- The Coase Theorem shows that the Law can still address distributional concerns, even if its primary goal is efficiency. Changing the initial allocation of property rights can have major distributional consequences.

The Coase Theorem gives conditions for bargaining to an efficient outcome, but what can we say about that outcome?

- First, the outcome must leave each player with a higher payoff than their threat point, where their threat point is defined as their expected value from the non-bargaining outcome.[2]
- Second, we usually assume that some share of the surplus goes to each party. In this class we often take this split to be half-and-half, but in the "real world," this split may depend on bargaining power.

Discussion:
What is your gut feeling about how often the Coase Theorem applies? Do you see the conditions as being fairly easy to satisfy, or do see them as being fairly restrictive? What are the legal implications of your view?

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[1] Remember your mathematical logic. A statement $(A \rightarrow B)$ is logically equivalent to its contrapositive $(\neg B \rightarrow \neg A)$. The statement's inverse $(\neg A \rightarrow \neg B)$ is logically equivalent to its converse $(B \rightarrow A)$. But a statement is *not* logically equivalent to its inverse and converse.

[2] This is often referred to as an "outside option."

Problems

1. (Homework Problem 1.) I own a plot of land in northern Wisconsin, on which I vacation. My next-door neighbor wants my land as well, to expand his own house. The value of the land to me is $\$150,000$. (That is, I would be indifferent between keeping the house, and losing the house but having $\$150,000$.) The value of the land to my neighbor is $\$275,000$. Which of the following are Kaldor-Hicks improvements?

   (i) My neighbor buys my land for $\$200,000$

   (ii) My neighbor buys my land for $\$275,000$

   (iii) My neighbor pressures the town council to force me to sell him the land for $\$125,000$

   (iv) My neighbor, while drunk, buys my land for $\$350,000$

   All of them are Kaldor-Hicks improvements. Once the "right" person owns the resource, transfers don't have any impact (positive or negative) on efficiency.[3]

2. (Homework Problem 3.) It's the 4th of July, and you need to decide how much money to spend on beer (b) and how much to spend on fireworks (f). Beer and fireworks each have a unit price of \$1, that is, \$1 gets you one unit of either good. You have \$50 to spend, and your utility function is

$$u(f,b) = 10\sqrt{f} + b$$

   Suppose that you are spending the holiday with four of your friends. You can only drink the beer that you bought, but you get to enjoy the fireworks that everyone bought. That is, each of you gets utility

$$u = 10\sqrt{F} + b$$

   where F is the total amount that the five of you collectively spent on fireworks, while b is still the amount that you individually spent beer.

   (c) Suppose you are perfectly rational and selfish. If you anticipate that each of your friends is going to spend \$5 on fireworks, how much would you choose to spend on fireworks and how much on beer? How much utility would this leave you with?

   (d) Is this efficient? Would you all be better or worse off if you agreed to each contribute \$20 to fireworks?

   (Extension) Given what you know from part (d), suppose you and your friends can agree ahead of time to set aside \$20 each to be spent on fireworks, and that you will be in charge of purchasing fireworks with this money.

   (g) What would happen once everyone contributes \$20 if there was no way to enforce the agreement?

   (h) Are you and your friends better off than if the agreement had never happened in the first place?

   Now suppose that you are spending the holiday with only one friend, and you drink your own beer and enjoy the fireworks both of you purchase.

   (i) What is the efficient amount to spend on fireworks?

   (j) For any amount g your friend spends on fireworks, what is the optimal amount of fireworks you should purchase?

   (k) Characterize all of the (pure) Nash equilibria in this setting.

   (l) How would the set of Nash equilibria change if your friend's wealth increased? What if it decreased? (Assume your wealth remains fixed at \$50.)

3. Suppose that a company plans to build a high-speed rail system to connect two major cities. The company estimates that the completed rail system can generate total revenues of 1 billion dollars. The company begins purchasing all the land between the two cities, with expenditures totaling 750 million dollars. As the company is about to lay the last stretch of rail, they get word that the final piece of rail will pass through a previously-overlooked plot of land belonging to a far-off, urban dwelling millennial who values the land at one dollar.

   (a) Suppose the law protects the right to private property. What are the threat points for both parties in this example?

   (b) Do you expect bargaining to lead to an efficient outcome (the party who values the land most getting it)?

   (c) Suppose bargaining would lead to a share β of the gains from cooperation going to the millennial, and a share $1-\beta$ going to the company (Where $0 < \beta < 1$). For what values of β is the company better off than before they began the project?

[3] Tolstoy's *Anna Karenina* begins: "Happy families are all alike; every unhappy family is unhappy in its own way." Restated for economics, one might say: "Efficient allocations are all alike; every inefficient allocation is inefficient in its own way."

(d) If this case went before a court, and the court was responsible for designing efficient laws for similar future scenarios (or establish a precedent which will lead to economic efficiency), what types of issues might the court consider?

4. Adam is a heavy smoker. He obtains utility as a function of the number of cigarettes (X) he smokes and the amount of money (m) he has:

$$U_A = 36X - 2X^2 + m_A$$

The costs of cigarettes are: $C(X) = X^2$.

Bob, who is Adam's roommate, detests smoking. His utility is a decreasing function in the number of cigarettes Adam smokes:

$$U_B = 128 - X^2 + m_B$$

Assume that Adam and Bob each starts with a sufficiently large amount of money M, such that their budget constraints never bind.

(a) How many cigarettes will Adam choose to smoke, if he lives alone and makes rational decisions?

(b) What is the efficient number of cigarettes when they live together?

(c) Suppose that Adam owns the apartment, and Bob has to bribe Adam to stop him from smoking. What is the utility threat point for Adam? For Bob? How much money will Bob be willing to pay Adam to make him smoke the efficient number of cigarettes?

(d) Suppose that Bob owns the apartment instead. What is the threat point for Adam? For Bob? How much money will Adam be willing to pay Bob to smoke the efficient number of cigarettes?

(e) Suppose that Bob owns the apartment, and Adam can only bargain with the help of a lawyer. What is the maximum amount that the lawyer is about to charge, if Adam pays the lawyer fees? What if Bob pays the fees instead?