Coase's Rebuttal to Pigou

1. Not all externalities are inefficient.
2. If there are no "transaction costs", individuals will bargain to the socially efficient outcome without the need for taxation.
   - This is what we know as "The Coase Theorem", but it was actually stated by George Stigler, and misses some of Coase's larger points.
3. If there *are* transaction costs, property rights should not be given to plaintiffs if plaintiffs are the lower-cost avoiders.

Example 1: Efficient Externality

Setting

- A train company can choose to run 0, 1, or 2 trains per day, at a cost of $500 per train.
- The total revenue earned is $2000 for one train, and $3000 for two trains.
- Sparks cause damage to crops near the tracks, valued at $250 per train.

Example 1: Efficient Externality

a) What number of trains will the train company choose to run before property rights are defined?

- The train company will seek to maximize its private profits.
- Private profit from running zero trains = $0; from running one train = 2000 – 500 = $1500; from running two trains = 3000 – 500 – 500 = 2000.
- 2000 > 1500 > 0, so the train company will choose to run two trains per day.

Example 1: Efficient Externality

b) What is the socially efficient number of trains?

- Efficiency requires maximization of the "social surplus", which, in this case, includes profit and crop damage.
- Social surplus from running zero trains = $0; from running one train = 2000 – 500 – 250 = $1250; from running two trains = 3000 – 500 – 500 – 250 – 250 = 1500.
- 1500 > 1250 > 0, so it is efficient to run two trains per day.

Example 1: Efficient Externality

c) What if a Pigouvian-minded policymaker imposed a tax of $250/train on train companies?

- The train company will seek to maximize its private net-of-tax profits
- Profit (net of tax) from running zero trains = $0; from running one train = 2000 – 500 – 250 = $1250; from running two trains = 3000 – 500 – 500 – 250 – 250 = 1500.
- 1500 > 1250 > 0, so the train company would choose to run two trains.
- The tax causes the train company to "internalize the externality", but in this case, the train company would choose the efficient quantity with or without the tax.

Example 1: Efficient Externality

d) What if the Pigouvian-minded policymaker decided to increase the tax to $550/train?

- Now, profit (net of tax) from running zero trains = $0; from running one train = 2000 – 500 – 550 = $950; from running two trains = 3000 – 500 – 500 – 550 – 550 = 900.
- 900 > 0, but 950 > 900; so now the train company would choose to run just one train, which is inefficient.
- In this case, no tax would have led to efficiency, but making “polluters pay” too much leads to an inefficient outcome!

Example 2: No Transaction Costs

Setting

- A dairy farmer earns $100 per year from selling milk.
- A grain farmer plants $200 worth of crops per year…
- … but the dairy cattle destroy $50 worth of those crops per year.
- The damage could be prevented if the dairy farmer tethered the cow at a cost of $30 per year, or if the grain farmer sprayed repellant on the crops at a cost of $10 per year.

Example 2: No Transaction Costs

a) What is the socially efficient outcome?

- Social surplus under status quo: 100 + 200 – 50 = $250/year.
- if cow tethered: 100 + 200 – 30 = $270/year.
- if repellant sprayed: 100 + 200 – 10 = $290/year.
- if dairy farmer leaves: $200/year.
- if grain farmer leaves: $100/year.
- The socially efficient outcome is therefore for the repellant to be sprayed, because this leads to the highest social surplus.

Example 2: No Transaction Costs

b) What if the grain farmer sues, and the court determines that the grain farmer has property rights, and that the dairy farmer must pay money damages?

- Dairy farmer's profit if he does nothing: 100 – 50 = $50/year.
- if he tethers the cow: 100 – 30 = $70/year.
- if he pays the grain farmer to spray the repellant: 100 – 10 – bribe = $(90 – bribe)/year.
- if he leaves: $0/year.

Example 2: No Transaction Costs

b) What if the grain farmer sues, and the court determines that the grain farmer has property rights, and that the dairy farmer must pay money damages? (continued)

- Bribing the grain farmer to spray the repellant leads to the highest profit for the dairy farmer as long as the bribe is less than $20/year.
- The grain farmer's profit would be $(200 + bribe)/year, so she would be better off agreeing to any bribe greater than $0/year.
- The two farmers will agree to a bribe between $0 and $20, and the repellant will be sprayed. Therefore, efficiency will be achieved.

Example 2: No Transaction Costs

c) What if the grain farmer sues, and the court determines that the dairy farmer has property rights?

- Grain farmer's profit if she does nothing: 200 – 50 = $150/year.
- if she pays the dairy farmer to tether the cow: 200 – 30 – bribe = $(170 – bribe)/year.
- if she sprays the repellant: 200 – 10 = $190/year.
- if she leaves: $0/year.
- Spraying the repellant leads to the highest profit for the grain farmer, so this is what she will choose. Therefore, efficiency will be achieved.

Example 2: No Transaction Costs

Conclusion

- The assignment of property rights does not matter from the perspective of efficiency: the repellant will be sprayed in either case.
- The social surplus is $290/year in both cases, though the *distribution* depends on property rights:
  - with grain farmer rights, dairy farmer profit is $90 – bribe and grain farmer profit is $200 + bribe;
  - with dairy farmer rights, dairy farmer profit is $100 and grain farmer profit is $190.

Example 3: Transaction Costs

Setting

- As before, a dairy farmer earns $100 per year from selling milk, a grain farmer plants $200 worth of crops per year, but the dairy cattle destroy $50 worth of those crops per year.
- Also as before, the damage could be prevented if the dairy farmer tethered the cow at a cost of $30 per year, or if the grain farmer sprayed repellant on the crops at a cost of $10 per year.
- But now, if money is exchanged between the farmers, the one paying must also pay $25 to a lawyer to witness each payment.

Example 3: Transaction Costs

a) What is the socially efficient outcome?

- Social surplus under status quo: 100 + 200 – 50 = $250/year.
- if cow tethered: 100 + 200 – 30 = $270/year.
- if repellant sprayed: 100 + 200 – 10 = $290/year.
- if dairy farmer leaves: $200/year.
- if grain farmer leaves: $100/year.
- Exactly the same as before. The socially efficient outcome is for the repellant to be sprayed, because this leads to the highest social surplus.

Example 3: Transaction Costs

b) What if the grain farmer sues, and the court determines that the grain farmer has property rights, and that the dairy farmer must pay money damages?

- Dairy farmer's profit if he does nothing: 100 – 50 = $50/year.
- if he tethers the cow: 100 – 30 = $70/year.
- if he pays the grain farmer to spray the repellant: 100 – 10 – bribe – 25 = $(65 – bribe)/year.
- if he leaves: $0/year.
- Tethering the cow leads to the highest profit for the dairy farmer, so this is what he will choose. Therefore, efficiency will NOT be achieved.

Example 3: Transaction Costs

c) What if the grain farmer sues, and the court determines that the dairy farmer has property rights?

- Grain farmer's profit if she does nothing: 200 – 50 = $150/year.
- if she pays the dairy farmer to tether the cow: 200 – 30 – bribe – 25 = $(145 – bribe)/year.
- if she sprays the repellant: 200 – 10 = $190/year.
- if she leaves: $0/year.
- Spraying the repellant leads to the highest profit for the grain farmer, so this is what she will choose. Therefore, efficiency will be achieved.

Example 3: Transaction Costs

Conclusion

- When transaction costs are present, the assignment of property rights can matter from the perspective of efficiency.
- In this case, if the grain farmer is given property rights (i.e. the “polluter pays” approach), efficiency will NOT be achieved.
  - the damage is prevented, but at too high a cost
- Giving property rights to the dairy farmer instead protects him from having to pay his higher prevention cost, and achieves efficiency.

How “Should” Courts Assign Property Rights?

- If there are no transaction costs, it doesn’t matter: efficiency will be achieved regardless.
- If there are transaction costs, assigning property rights to the higher-cost avoider/preventer places the burden of prevention on the lower-cost avoider, so efficiency will be achieved.
- Coase recommended that courts take a case-by-case approach and determine property rights in favor of the higher-cost avoider.

How "Should" Courts Determine the Type of Relief?

- An injunction can be bargained around just as money damages can be bargained around.
  - So, again, if there are no transaction costs, it doesn't matter.
- If there are transaction costs, an injunction order might mean that closing down is the defendant's most profitable action, even if the outcome is very inefficient.
- If transaction costs are high, courts can calculate and enforce money damages; otherwise, injunctions are simpler.