Chapter 10 Review
Dealing With Externalities

• Readings • Chapter 10, all

Outline

I. Overview of the Externality Problem
   A. Person A: “Don’t we realize we are doing it to ourselves? We are the one’s causing the pollution. Why don’t we just wake up to the reality and stop it?”
   Person B: “Okay. We are doing to ourselves collectively. We are doing it to ourselves as a society. We aren’t, however, doing it to ourselves individually.”

   B. Negative Externalities
       I don’t feel your pain.
       ex. pollution

   - D = Private Value = Social Value
   - S = Private Cost ≠ Social cost
   - Private sector does too much of a bad thing
   - … but … often, the optimal amount of pollution is not zero. Reducing pollution is costly and often times the environment can handle small amounts of
pollution relatively well. Ex (albeit an extreme one). Methane is a greenhouse gas. Animals produce methane. Should we eliminate all animals to keep methane releases down to 0?

C. Positive externalities

ex.  immunization, low water consumption toilets, wetlands restoration, basic education

_I don’t feel your gain._

II. Dealing With Externalities: 1<sup>st</sup> try

A. Leave it alone

B. Information Campaigns and/or Social pressures

III. Dealing With Externalities 2: Contracts and Litigation

The Coase Theorem:

If there are

1) well-defined property rights
2) easily observable actions
3) low enforcement & bargaining costs
4) few parties involved
Then, private parties will tend to negotiate to internalize externalities.
ex. A private lake-owner agrees to let me catch fish in her pond ... for a fee. What was an external cost (me taking her fish without pay) becomes an internal cost.
How likely is this to be an effective solution for national/global problems?

IV. Dealing With Externalities 3: Regulation and standards
A. amount produced
B. method of production
C. Good points:
   • easy to enact
   • We don’t have to measure the actual amount of pollution. We can instead specify a certain technology/process.
D. Bad points
   • not very flexible if things change
   • seldom the least cost method of reducing the externality

V. Dealing With Externalities 4: Pigouvian Taxes & Subsidies
1. Pigouvian Taxes
   • Definition/example
• Bad: requires ability to measure the activity
• Good: more flexible
• Good: more likely to lead to least cost method of reducing pollution
• Good: generates government revenues
• Another tax rule: “Tax activities which generate external costs”

2. Pigouvian Subsidies

VI. Dealing With Externalities 5: Tradable Pollution Permits

A. Overview
B. Examples
C. What’s nice about this … see handout

Text and Study Guide Questions

Questions for Review
1, 2, 3, 4, and 6

Problems and Applications
1a, 2, 3, 5, 6, 7b, 7c, 10, 11, 12

Other Questions

1. (This one is a bit of flashback to past chapters.) Jim and Christine are two economists. Christine thinks that a special, high, sales tax on all food items is a good idea. Jim thinks that a sales tax on all food items is a bad idea. Which of the following is most likely true?
   a. Jim is more concerned with equity. Christine is more concerned with economic efficiency.
   b. Jim is more concerned with economic efficiency. Christine is more concerned with equity.
   c. Jim is more concerned with minimizing deadweight loss. Christine is more concerned with economic efficiency.
   d. Jim is more concerned with economic efficiency. Christine is more concerned with minimizing deadweight loss.

2. In the past, many used tires have simply been dumped anywhere a person could get rid of them. These tires, incredibly slow to decompose, can become a major pollution/environmental problem. As a result, some states now charge a special tax whenever someone buys new tires (and thereby gets rid of their old tires). What type of tax is this?
   a. a tax that cannot be shifted to buyers.
   b. a tax that is always in the upward sloping range of the laffer curve
   c. a pandoran tax
d. a pigouvian tax
   e. both a and b are correct

3. For what industry, and type of pollution, have tradable pollution permits been tried?
a. the retail tire industry in Louisiana (dumping of used tires)
b. Stanford University football games (blocking the view of others by standing up)
c. the retail liquor and bar industry in Boulder, Colorado (public intoxication)
d. the electric utility industry in the U.S. Southwest (air pollution)
e. none of the above

4. At right, you are given the (private) supply and demand curves for paper production in the United States. Economists have estimated that each ton of paper produced generates $40 in external costs. Assume this estimate is accurate. What is the socially optimal amount of paper production in the U.S.?
a. 0
b. 3 Million
c. 4 Million
d. 5 Million
e. none of the above

5. (continued from 4) Which of the following government actions should get the private sector to produce the socially optimal amount?
   a. Offer a $75 subsidy per each unit produced.
   b. Impose a $75 tax per each unit produced.
   c. Offer a $45 subsidy per each unit produced.
   d. Impose a $45 tax per each unit produced.
   e. Offer a $40 subsidy per each unit produced.
   f. Impose a $40 tax per each unit produced.
   g. Offer a $25 subsidy per each unit produced.
   h. Impose a $25 tax per each unit produced.
i. none of the above

6. In this class we were given several criteria one wants in a good that is being taxed. Based on these criteria, which of the following goods would be the best to tax?
   a. Good a: E_D = 1.2, E_S = 1.3, External benefits are generated when a is produced and sold.
   b. Good b: E_D = 1.2, E_S = 1.3, External costs are generated when b is produced and sold.
   c. Good c: E_D = 1.2, E_S = 0.6, No externalities are generated when c is produced and sold
   d. Good d: E_D = 0.7, E_S = 0.6, External benefits are generated when d is produced and sold.
   e. Good e: E_D = 0.7, E_S = 0.6, External costs are generated when e is produced and sold.
7. Before the middle 1980s, it was very difficult to accurately measure the amount of SO$_2$ emitted by coal burning power plants. Since then, cheap technology has been produced which can measure the level of SO$_2$ emissions as they occur. How will this affect methods of dealing with SO$_2$ pollution?
   a. Direct regulation becomes relatively more attractive. Taxes and tradable permits become a relatively less attractive option.
   b. Direct regulation becomes relatively less attractive. Taxes and tradable permits become a relatively more attractive option.
   c. Laissez-faire, i.e. no government intervention in the market, becomes the most attractive option.
   d. As predicted in *Progress and Poverty*, social pressures will greatly reduce pollution as the pollution levels become public information.

8. Which of the following is the best example of an activity generating external benefits?
   a. Bob takes the time to be an informed voter.
   b. Sue lets her dog eat her neighbor’s flowers.
   c. Pam raises the price she charges Maggie to mow Maggie’s lawn.
   d. Pam lowers the price she charges Maggie to mow Maggie’s lawn.

9. You have been paid large sums of money to consult for the government of Hieroglyphia. Unfortunately, your command of the local language is a bit weak. You know that production of the good $\textit{FIME}$ generates external benefits. You have no idea, however, what $\textit{FIME}$ is. In the absence of government intervention, private markets will tend to:
   a. produce more $\textit{FIME}$ than is socially optimal.
   b. produce the socially optimal amount of $\textit{FIME}$.
   c. produce less $\textit{FIME}$ than is socially optimal.
   d. produce the amount of $\textit{FIME}$ that is optimal for government, but not for private producers.
   e. produce no $\textit{FIME}$.

10. In which case would litigation (or the Coase theorem) most likely result in a socially optimal amount of pollution?
    a. A single paper mill is dumping waste into a large public lake used by thousands of fishers and boaters.
    b. A single paper mill is dumping waste into a small, private lake, owned by a single resort offering fishing and recreation.
    c. Hundreds of boaters are leaking oil into a large public lake used by thousands of fishers and boaters.
    d. Hundreds of boaters are leaking oil into a small, private lake owned by a resort company.
Answer problems 11 – 14 based on the following information. Assume there are 4 coal burning power plants producing a total of 4,000 tons of pollution before there is any government regulation. Economists have determined (correctly) that the socially optimal amount of pollution is 3,000 tons/year. The amount of pollution produced by each firm, before government intervention, is given below. The cost of reducing pollution is also given below for each firm.

<table>
<thead>
<tr>
<th></th>
<th>Firm W</th>
<th>Firm X</th>
<th>Firm Y</th>
<th>Firm Z</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of pollution produced before govt. intervention</td>
<td>1,000 tons/year</td>
<td>1,000 tons/year</td>
<td>1,000 tons/year</td>
<td>1,000 tons/year</td>
<td>4,000 tons/year</td>
</tr>
<tr>
<td>Cost of reducing pollution (per ton, per year)</td>
<td>$50.00</td>
<td>$20.00</td>
<td>$30.00</td>
<td>$40.00</td>
<td></td>
</tr>
</tbody>
</table>

11. From an efficiency standpoint, which of the following is true?
   a. All firms should reduce pollution by 250 tons.
   b. Firm W should reduce pollution by less than 250 tons. (i.e. The other firms reduce pollution by more than 250 tons.
   c. Firm X should reduce pollution by less than 250 tons. The other firms reduce pollution by more than 2500 tons.
   d. Which ever firm is the largest, i.e. produces the most electricity, should reduce pollution by more than 250 tons.

12. Assume that the government issues each firm, free of charge, tradable permits for 750 tons of pollution (for a market total of 3,000 tons). Assume the market for pollution permits stays competitive (i.e. Firms do not use them as means to keep other firms from producing). Also, no one other than the four firms buys or sells permits. Which of the following will be true?
   a. W will be a net buyer of permits to pollute (i.e. W will buy more permits than it is issued).
   b. X will be a net buyer of permits to pollute (i.e. X will buy more permits than it is issued).
   c. Both W and X will keep their original # of permits to pollute and neither buy nor sell any permits.
   d. Which ever firm is the largest, i.e. produces the most electricity, will be a net buyer of permits.

13. Assume that the government sells tradable permits, for a total of 3,000 tons of pollution, to the highest bidder. Assume the market for pollution permits stays competitive (i.e. Firms do not use them as means to keep other firms from producing). Also, no one other than the four firms buys (or re-sells) the permits. Which of the following will be true?
   a. W will buy the most permits.
   b. X will buy the most permits.
   c. W and X will both buy the same amount of permits (≅ 750 tons).
   d. Which ever firm is the largest, i.e. produces the most electricity, will buy the most permits.
14. The government is considering two plans for tradable pollution permits. In one plan, the government will simply give each firm permits for 750 tons (for an industry total of 3,000 tons). In the other plan, the government will sell the permits to the highest bidder. Which of the following is true?
   a. The plan which sells the permits should always result in less pollution.
   b. The plan which simply gives firms the permits should always result in less pollution.
   c. Both plans should result in about the same amount of pollution.

15. Currently, there is a pending environmental agreement, supported by most nations of the world. The U.S., however, does not back this accord. Al Gore supported it and George Bush opposes it. This accord makes use of tradable pollution permits. What is the name of this accord/agreement?

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**Answer to # 4 & 5 of Other Questions**

4. At right, you are given the (private) supply and demand curves for paper production in the United States. Economists have estimated that each ton of paper produced generates $40 in external costs. Assume this estimate is accurate. What is the socially optimal amount of paper production in the U.S.? 2 Million e. none of the above

Further, one could argue that buyers should be paying $75 for each unit of paper and that sellers should be receiving $25.

5. f Tax an activity generating an external costs. Ideally, the tax should be equal to the (Marginal) external costs. This tax, in effect, makes buyers and sellers internalize (i.e. pay and account for) the costs they are imposing on third parties.

6 – 15. You’re on your own here.