Chapter Summaries
Chapter 7: Externalities – Policy Considerations

Chapter 7 presents a number of policy issues in the battle against pollution. It begins with the Coase Theorem, a prescription for the minimal amount of government intervention to achieve an efficient amount of pollution or any other externality.

1. The Coase Theorem says that all the government need do is assign property rights to clean air or water. Once the rights have been assigned, the polluters and their victims have an incentive to negotiate the optimal amount of pollution. In the pollution-proportional-to-output model, assigning the property rights to the firms gives them the right to produce (pollute) and leads the victims to buy some of the rights from the firms so that the firms lower their production (pollution). Assigning the property rights to the victims leads the firms to buy rights from the victims to be able to produce (pollute) at all. Unfortunately, the Coase Theorem tends to apply only when there are small numbers of polluters and victims, which does not characterize many important examples of pollution.

The chapter then considers some measurement problems with pollution.

2. Even if the government can measure the aggregate marginal damages of pollution, its first measurements will be taken at the zero-tax competitive equilibrium. Setting a tax equal to those damages is too high; it overshoots the optimum and generates too much pollution reduction. Resetting the tax to the now too-low level of aggregate marginal damages overshoots the optimum in the other direction and generates too little pollution reduction. But resetting the taxes each time homes in on the optimal tax rate as the with-tax equilibrium gets ever closer to the efficient equilibrium.

3. There are so many gaps in scientific knowledge regarding the damages from pollution that governments typically set an arbitrary target amount of pollution reduction and then try to reach the target at minimum cost.

4. The quantity response to reducing pollution is referred to as the command-and-control (CAC) approach. It is an even-handed policy, such as requiring each firm to reduce its pollution by the same amount or requiring each firm to use a certain pollution-reducing technology, such as putting scrubbers on smokestacks. The CAC approach is excessively costly because it does not take into account that firms have different marginal costs or that they vary in their abilities to substitute capital and labor for water or air as a means of disposing of their industrial wastes.

5. The least-cost strategies are pricing policies such as taxes for polluting, subsidies for reducing pollution, and marketable permits. These three policies can be designed to be equivalent on the margin. In each instance, firms' costs increase on the margin if they increase their pollution and decrease on the margin if they reduce their pollution. They meet the overall pollution reduction target at the lowest aggregate cost because they allow each firm to respond to the tax, or subsidy, or system of permits in the manner that is least costly for that particular firm.

    There are some practical differences in the three pricing options that policymakers need to consider. These differences may lead to a preference for one of the options in certain circumstances.

6. Subsidies to firms to reduce pollution are obviously kind to the firms. But since they subsidize firms in total, they generate an incentive for investors to enter the industry to obtain the subsidy. If pollution is directly related to output, then the overall amount of pollution can increase. Pollution taxes avoid this problem; they raise firms' marginal and total costs.

7. Marketable permits have advantages and disadvantages relative to pollution taxes. Two advantages are:
    - That they give the government a direct means of reaching the pollution reduction target, whereas taxes may have to be adjusted to hit the target
    - That the price of a permit adjusts automatically for inflation, whereas tax rates have to be continually adjusted for inflation.

    Potential disadvantages of permits are:
    - That they may act as a barrier to entry if large firms buy more permits than they need to make it difficult for potential entrants to purchase the permits that they would require to enter the industry.
    - That the market for permits tends to be national in scope and establishes one price for a permit. One price is correct if the pollution takes the form of an aggregate externality, but most forms of pollution are local or

regional in their impacts. In this case, a system of different regional or local pollution taxes is the better option.

8. Both the benefits and costs of reducing pollution are uncertain to some extent. This matters because permits are more effective in controlling the amount of pollution reduction and taxes are more effective in controlling the costs of pollution reduction. If the marginal benefits of pollution reduction are steeper than the marginal costs near the optimum then permits are preferred, to avoid the possibility that there will be too little pollution reduction, with high remaining marginal damages. If the marginal costs of pollution reduction are steeper than the marginal benefits near the optimum then taxes are preferred, to avoid the possibility that there will be too much pollution reduction that is excessively costly.

The chapter then discusses defensive strategies to reduce the harm caused by pollution, such as waste treatment and subsidizing the victims of pollution.

9. Waste treatment of pollutants is worth considering because there are typically large economies of scale in cleaning up pollutants.

10. The best strategy is a combination of pricing pollution at its source, and waste treatment of some or all of the remaining pollutants. The goal in the combined strategy is to equalize the marginal costs of each option to minimize the costs of reducing pollution by a targeted amount.

11. Subsidizing the victims is generally not a good policy. By not pricing pollution at its source, the pareto-optimal conditions for polluting goods cannot be achieved. Also, the subsidy introduces inefficiencies in other markets. Suppose, for example, that the government subsidizes the purchase of paint by people whose homes have been damaged by pollution. If so, then the pareto-optimal condition that all consumers should have the same marginal rate of substitution between paint and some reference good cannot be satisfied, since the victims and the non-victims face different prices for paint. If victims are to be subsidized they should be given lump-sum subsidies. But pollution still needs to be priced at its source.

The final example relates to the problem that the direct beneficiaries of a pricing policy to reduce pollution or some other harmful externality may resist the policy. Road congestion is the example.

12. Drivers on congested urban roadways resist congestion tolls if the tolls they pay exceed the direct benefit to them of the reduced congestion resulting from the tolls, and if they do not believe they get any benefit from the public services that the government finances with the toll revenues.