

Exercise B

1. Should the value of a statistical life be adjusted for a person's age or health status? For instance, in the early years of George W. Bush's presidency, the Office of Management and Budget proposed using a lower VSL for senior citizens than for younger people. Other proposals suggested using a lower VSL for people with serious or chronic illnesses. What are the implications of using different values for different groups of people? What justifications might exist for having different VSLs? What reasons are there for using the same VSL for all people?
2. Buchanan Industries receives profits from polluting according to the formula $\text{Profits} = \pi = 10Q - Q^2$, where Q =pollution emitted (in tons), and profits are measured in dollars. Marginal benefits (MB) of polluting, derived from this function, are $MB = 10 - 2Q$. The damages associated with pollution from this facility are estimated as $\text{Damages} = D = Q^2 + 2Q$, where damages are measured in dollars. The marginal damages (costs) associated with that function are $MD = 2Q + 2$.
 - (a) Draw a graph with the marginal benefits and marginal damage curves. Be sure to label the axes.
 - (b) If Buchanan Industries could ignore the damages it caused, how much Q would it produce? How much profit would it earn at this level of production? How much would total damages be? What would be the net benefits, the difference between profits and damages?
 - (c) What is the efficient Q for this industry? How much profit would Buchanan Industries earn at this level of production? How much would total damages be? What would be the net benefits, the difference between profits and damages?
 - (d) Deadweight loss is the difference between the net benefits with the efficient level of pollution and net benefits with another level of pollution. What is the deadweight loss associated with Buchanan Industries ignoring damages that its production causes? Show the deadweight loss on your diagram. If Buchanan Industries would not on its own produce at the efficient Q , is it acting contrary to its own best interests by producing at the level in (c)?
 - (e) Those who live near Buchanan Industries propose that Buchanan Industries produce no more than $Q=1$. What is the deadweight loss associated with this level of production? If $Q=1$ is an inefficient level of production, are those who live near the factory acting contrary to their own best interests by pushing for $Q=1$?
 - (f) Who benefits from reducing Q from the initial level in (a) to the efficient level in (b)? Who bears the costs? Is this change Pareto improving?
3. A pollution control agency is considering the following regulatory policies:
 - (i) Taxing the use of one input that increases pollution. (Other inputs affect pollution too, both increasing and decreasing it.)
 - (ii) Taxing the final goods that firms produce and sell on the market.
 - (iii) Taxing pollution.For each of the following questions, explain why you have answered with the policy that you have, and explain why you have chosen that policy over the other two.
 - (a) Which of these policies is most likely to reduce pollution?

- (b) Which of these policies might actually lead to an increase in pollution?
 - (c) Which of these policies is most likely to be financially damaging to firms?
 - (d) Which of these policies is most likely to encourage innovative methods of pollution reduction?
4. Two pollution sources are located in the same town, immediately next to each other. For every quantity of abatement, marginal costs of abatement for the first source are higher than marginal costs of abatement for the second source.
- (a) If both the tax and standard achieve the same level of total emissions, is a uniform pollution tax more efficient than a uniform pollution standard (that is, a tax or a standard that is the same for both sources), less efficient than a uniform standard, or are you unable to tell? Why?
 - (b) Would the sources prefer to face a pollution subsidy or a marketable permit scheme, if permits are distributed at no cost based on the standard in (a), and both the subsidy and the permit scheme achieve the same level of total emissions? Why?
5. An activity to improve the well-being of some impoverished people will provide benefits of \$1 million right now, but it will obliterate the earth in 200 years. The world's value in 200 years is projected at \$10¹². There are no costs or benefits between these two dates.
- (a) Is it worth avoiding the world's destruction in 200 years at a 10 percent discount rate?
 - (b) Is it worth avoiding the world's destruction in 200 years at a 6 percent discount rate?
 - (c) If 10 percent is the interest rate in the private sector, what are some of the arguments for using a 10 percent discount rate?
 - (d) What are some of the arguments for a lower discount rate?
 - (e) Do you think discounting and benefit-cost analysis are appropriate ways to handle this problem? Why or why not?