2 Siting a new restaurant

A Boston chef wants to open a new locally sourced diner, and has identified two potential locations: a downtown location (call this choice the "near") and one that's off the beaten path (call this choice "far"). The downtown location would be ideal in terms of foot traffic, but is located directly next to an old dry cleaner. The dry cleaner's cleaning method gives off an unpleasant smell, which diners find off-putting.

Fortunately, new "green" dry cleaning techniques exist which get clothes just as clean without producing any odor. The dry cleaner currently earns $1000 per day, and switching to the green method would cost $400 per day.

Profits for each firm under each of the four scenarios are given in the following table:

Scenario	Green Cleaning	Restaurant Location	Cleaner Profits	Restaurant Profits
1	No	Far	1000	400
2	No	Near	1000	200
3	Yes	Far	600	400
4	Yes	Near	600	1000

1. (5 points) Which scenario is the efficient outcome?

Solution:

First calculate the efficient outcome under each.

Scenario 4. The economically efficient outcome is the profit-maximizing outcome, since we assumed profits represent net benefits to society. Thus the combination of green cleaning and the downtown location represents the efficient outcome.

2. (4 points) Assume the restaurant is given the right to an odor-free establishment, and cooperation between the firms is infeasible. Which of the four potential scenarios will occur?

Solution:

Scenario 4. The cleaner must remove the owner. Since it still earns positive profits, it stays in business.

The chef simply chooses between locating near and far based on which location is more profitable once the odor is eliminated. The optimal choice is to locate nearby and earn 1000.

3. (4 points) What if the cleaner is given the right to pollute, and cooperation between the firms is infeasible. Which of the four potential scenarios will occur?

Solution:

Scenario 1. The cleaner will not go green. The chef fishery chooses between locating near and far based on which location is more profitable when the cleaner produces the oder. The optimal choice for the chef is to locate far away and earn 400.

4. (5 points) Now assume cooperation is feasible. What does the Coase Theorem predict will happen?

   Assume the cleaner has the right to pollute. **Explicitly describe the terms of any cooperation (ie any side payments).**

Solution:

Coase predicts that the efficient outcome will obtain, so scenario 4.

In the previous problem, we found that scenario 1 would occur, with the cleaner earning 1000. To go to scenario 4, he must be paid at least $400 to cover the cost of going green.

Under scenario 1, the chef earns only $400. So he'd be willing to pay up to $600 to get to the clean downtown outcome.

[2 pts for saying outcome 4; 2 points for getting transfer right

5. (5 points) City planners across the country fret about the impact of unsightly (or in this case smelly) legacy businesses, fearful that the externalities they generate keep new businesses away. Does your analysis in this problem suggest these concerns are without merit? What conditions have to be true for the Coase Theorem to produce an efficient outcome?

Solution:

The key conditions for the Coase Theorem are well defined property rights, no income effects and no transaction costs. As we discussed in class, the final conditional rarely holds in the real world. This suggests that Pigouvian penalties can still improve welfare.

Full credit required some justification of whether you think these conditions are likely to be met in the the case of urban businesses. In the case of urban business, there are lots of potential new businesses and nearby affected parties that make negotiation complex. Enforcement would likely involve costly monitoring and lawyers, etc.

3 Policy design

Congress is considering regulating emissions of gunk, a harmful uniformly mixing stock pollutant. A panel of experts convened by the National Academy of Sciences has determined that gunk emission reductions have a constant marginal benefit of $20 per ton.

Only two firms produce gunk (firms 1 and 2), but their abatement cost functions are unknown. Both firms have baseline emissions of 50 tons.

1. (5 points) Even though the costs are unknown to Congress, explain why setting a tax of $20/ton will be cost-effective.

   Solution:

   Under a tax, firms abate until marginal costs equal the tax. Since both sectors fax the tax, they will both abate until MC = $20. Since this is the same number for both firms, their marginal abatement costs are also equal, which is the condition for cost effectiveness.

2. (4 points) Will this $20 tax also be efficient? Briefly explain.

   Solution: Yes, since MB = 20, and since MC = tax, this sets MB = MC